



Version 2.3



BEANAIR®

BEANGATEWAY® USER MANUAL





"Rethinking sensing technology"

Document version : 2.3

Document type : User Manual

BeanGateway® User Manual

DOCUMENT

Document number		Version	2.3
External Reference		Last Publication date	08/06/2015
Author	Maxime Obr.		
Document code		Project Code	
Document Name	BeanGateway® User Manual		

VALIDATION

Function	Recipients	Validation	Information
Writer	Maxime Obr.		
Reader	Mohamed-Yosri Jaou.		X
Approbation	Christophe Dont.	X	

DIFFUSION

Function	Recipients	Validation	Action
Reader 1	Maxime Obr., Embedded software engineer	X	
Reader 2	Mohamed-Yosri Jaou., Embedded software engineer	X	

The information contained in this document is the proprietary information of BeanAir.

Updates

Version	Date	Author	Evolution & Status
1.6	28/08/2011	Christophe DONTGREUIL	<ul style="list-style-type: none">Related documents updated
1.7	20/04/2012	Christophe DONTGREUIL	<ul style="list-style-type: none">Micro-SD Feature updated
1.8	10/06/2012	Christophe DONTGREUIL	<ul style="list-style-type: none">Network Cartography feature added
1.9	20/09/2012	Christophe DONTGREUIL	<ul style="list-style-type: none">New version of the BeanGateway® GSM/GPRS & BeanGateway® GPS
2.0	17/03/2013	Christophe DONTGREUIL	<ul style="list-style-type: none">External Mounting brackets descriptionNew BeanGateway® Indoor description
2.1	20/01/2014	Christophe DONTGREUIL	<ul style="list-style-type: none">BeanGateway® wall mounting instructions
2.2	16/10/2014	Maxime Obratzov	<ul style="list-style-type: none">BeanGateway® Picture changedTimeSync function added
2.3	08/06/2015	Maxime Obratzov	<ul style="list-style-type: none">RS485, RS232 technical specifications addedModBus® Protocol



Please consider the environment before printing this document.

Page : 2 / 87

The contents are confidential and any disclosure to persons other than the officers, employees, agents or subcontractors of the owner or licensee of this document, without the prior written consent of BeanAir GmbH, is strictly prohibited.

BeanAir makes every effort to ensure the quality of the information it makes available. Notwithstanding the foregoing, BeanAir does not make any warranty as to the information contained herein, and does not accept any liability for any injury, loss or damage of any kind incurred by use of or reliance upon the information.

BeanAir disclaims any and all responsibility for the application of the devices characterized in this document, and notes that the application of the device must comply with the safety standards of the applicable country, and where applicable, with the relevant wiring rules.

BeanAir reserves the right to make modifications, additions and deletions to this document due to typographical errors, inaccurate information, or improvements to programs and/or equipment at any time and without notice.

Such changes will, nevertheless be incorporated into new editions of this document.

Copyright: Transmittal, reproduction, dissemination and/or editing of this document as well as utilization of its contents and communication thereof to others without express authorization are prohibited. Offenders will be held liable for payment of damages. All rights are reserved.

Copyright © BeanAir GmbH 2015



Contents

1. TECHNICAL SUPPORT	7
2. VISUAL SYMBOLS DEFINITION	8
3. ACRONYMS AND ABBREVIATIONS	9
4. RELATED DOCUMENTS & VIDEOS	10
4.1 Applications Notes.....	10
4.2 Technical Notes.....	11
4.3 Related videos.....	12
5. DOCUMENT ORGANIZATION.....	13
6. BEANGATEWAY® - PRODUCT PRESENTATION	14
6.1 Product overview	14
6.2 BeanGateway® Technical specifications	16
6.2.1 Common specifications.....	16
6.2.1.1 Wireless sensor network coordinator	16
6.2.1.2 Ethernet/LAN Network	17
6.2.1.3 Power supply	17
6.2.1.4 Embedded file system on Micro-SD® -Options	17
6.2.2 GPS Module (BeanGateway® GTW –GPS version).....	18
6.3 Casing description	19
6.3.1 BeanGateway® Indoor Version	20
6.3.2 BeanGateway® Outdoor version.....	22
6.3.3 Led Description	24
6.4 Antenna specifications.....	25
6.4.1 2.4 GHz – Indoor Antenna	25
6.4.1 2.4 GHz – Outdoor Antenna	26
6.4.2 GPS Antenna (available only on the BeanGateway® GPS)	27
6.5 Integrated UPS (Uninterruptible power supply)	27
6.6 Serial Line specifications (RS232/RS485)	29
6.6.1 RS232 Line (BeanGateway® Indoor only)	29
6.6.1.1 Technical features	29
6.6.1.2 Wiring code	29
6.6.2 RS485 Line	30
6.6.2.1 Technical features	30
6.6.2.2 Switchable termination.....	30
6.6.2.3 RJ45 Wiring code (BeanGateway® Indoor version).....	30



6.6.2.4	M12-4 Pins Plug Wiring code (BeanGateway® Outdoor version).....	31
7.	BEANGATEWAY® INSTALLATION GUIDELINES.....	32
7.1	How to install the BeanGateway®.....	32
7.1.1	Wall mounting	32
7.1.2	Desktop installation.....	33
7.1.3	Wall mounting kit for the BeanGateway® outdoor	33
7.1.3.1	Die cast external mounting brackets	33
7.1.4	Mounting brackets design.....	34
7.1.5	Plug the 2.4GHz antenna	35
7.1.5.1	BeanGateway® outdoor version.....	36
7.2	Power supply socket wiring	36
7.2.1	BeanGateway® outdoor power supply	37
7.2.2	BeanGateway® indoor power supply	37
7.3	Data logger Module (Micro-SD®)	39
7.3.1	Introduction	39
7.3.2	How to insert a Micro-SD® card on your Beangateway®?	39
7.3.3	Functions	41
7.3.4	Common Files on the memory card	41
7.3.4.1	Organization of Files	41
7.3.4.2	Type of file created on the memory card.....	42
7.3.5	Using the Data converter application (from raw file to text file)	42
7.3.5.1	Location of the converter	42
7.3.5.2	How to use the conversion application?.....	42
7.3.6	Log text files generated by the application	44
7.3.6.1	Controlling the MicroSD Data Logger of the BeanGateway using the BeanScape	44
7.4	How to mount your GPS Antenna (available only on Beangateway® GPS) ?.....	46
8.	START YOUR APPLICATION.....	47
8.1	Connect your BeanGateway® to your PC/Laptop.....	47
8.2	Setting up a network on your computer.....	48
8.3	Start the BeanScape®.....	52
8.4	LAN/ETHERNET Configuration (for advanced user only).....	54
8.5	BeanGateway® profile	56
8.5.1	BeanGateway® profile status description	57
8.5.1.1	Frame : Battery status	58
8.6	User-configurable parameters.....	59
8.6.1	Custom Display.....	60
8.6.2	Notes.....	60
8.6.3	Radio Configuration	61
8.6.3.1	Wireless sensor network diagnostic: Energy Scan.....	62
8.6.4	System Configuration	64
8.6.5	GPS module status	66
8.7	Log File Organization	70
8.7.1	Log file system overview.....	70



8.7.2	Log file directory	70
8.7.3	GPS Log File Organization (BeanGateway® GPS only)	72
8.7.3.1	Log file naming format	72
8.7.3.1	Log file analysis	72
8.7.4	Network diagnostic file organization	73
8.7.4.1	Log file naming format	73
8.7.4.2	Log file analysis	73
9.	MAINTAINING AND SUPERVISING BEANGATEWAY®	76
9.1	Diagnosis using BeanScape®	76
9.1.1	Knowing the PAN ID and IP address of your BeanGateway	76
9.1.2	System Maintenance	77
10.	TROUBLESHOOTING BEANGATEWAY: FAQ	78
11.	ENVIRONNEMENTAL CONSTRAINTS	79
11.1	Sealing	79
11.2	Sensitivity to radio frequency	79
11.3	Temperature	79
11.4	Humidity	79
11.5	Reflections, Obstructions and Multipath	79
11.6	SHOCKS & VIBRATIONS	79
11.7	Antenna	80
11.8	Others features	80
12.	APPENDICES	81
12.1	Appendix 1: GPS MODULE	81
12.1.1	What is GPS?	81
12.1.2	How it works?	81
12.1.3	Frequencies used	81
12.1.4	Sources of GPS signal errors	82
12.2	Appendix 3: How the connection is established between the Beangateway® and the BeanScape® ?	83





"Rethinking sensing technology"

Document version : 2.2

Document type : User Manual

BeanGateway® User Manual

1. TECHNICAL SUPPORT

For general contact, technical support, to report documentation errors and to order manuals, contact **BeanAir Technical Support Center** (BTSC) at:

tech-support@beanair.com

For detailed information about where you can buy the BeanAir equipment/software or for recommendations on accessories and components visit:

www.beanair.com

To register for product news and announcements or for product questions contact BeanAir's Technical Support Center (BTSC).

Our aim is to make this user manual as helpful as possible. Keep us informed of your comments and suggestions for improvements.




BeanAir appreciates feedback from the users of our information.



Please consider the environment before printing this document.

Page : 7 / 87

2. VISUAL SYMBOLS DEFINITION

Symbols	Definition
	<i><u>Caution or Warning</u> – Alerts the user with important information about BeanAir wireless sensor networks (WSN), if this information is not followed, the equipment /software may fail or malfunction.</i>
	<i><u>Danger</u> – This information MUST be followed if not you may damage the equipment permanently or bodily injury may occur.</i>
	<i><u>Tip or Information</u> – Provides advice and suggestions that may be useful when installing BeanAir Wireless Sensor Networks.</i>



3. ACRONYMS AND ABBREVIATIONS

AES	Advanced Encryption Standard
CCA	Clear Channel Assessment
CSMA/CA	Carrier Sense Multiple Access/Collision Avoidance
GTS	Guaranteed Time-Slot
kSps	Kilo samples per second
LLC	Logical Link Control
LQI	Link quality indicator
LDCDA	Low duty cycle data acquisition
MAC	Media Access Control
PAN	Personal Area Network
PER	Packet error rate
RF	Radio Frequency
SD	Secure Digital
WSN	Wireless sensor Network



4. RELATED DOCUMENTS & VIDEOS

In addition to this User manual, please consult the related application notes, technical notes and videos:

4.1 APPLICATIONS NOTES

Document name (Click on the weblink)	Related product	Description
<u>AN RF 007 : “Beanair WSN Deployment”</u>	All BeanAir products	Wireless sensor networks deployment guidelines
<u>AN RF 006 – „How to extend your wireless range”</u>	All BeanAir products	A guideline very useful for extending your wireless range
<u>AN RF 005 – BeanGateway® & Data Terminal Equipment Interface</u>	BeanGateway®	DTE interface Architecture on the BeanGateway®
<u>AN RF 004 – “Coexistence And Interferences@2.4GHz”</u>	All BeanAir products	Coexistence & interferences of different RF technologies in the 2.4 GHz frequencies band.
<u>AN RF 003 - “IEEE 802.15.4 2.4 GHz Vs 868 MHz”</u>	All BeanAir products	Comparison between 868 MHz frequency band and a 2.4 GHz frequency band.
<u>AN RF 002 – “Structural Health monitoring on bridges”</u>	All BeanAir products	The aim of this document is to overview Beanair® products suited for bridge monitoring, their deployment, as well as their capacity and limits by overviewing various data acquisition modes available on each BeanDevice®.



4.2 TECHNICAL NOTES

Document name (Click on the weblink)	Affected product	Description
<u>TN RF 010 – « BeanDevice® Power Management »</u>	All the BeanDevice®	This technical note describes the sleeping & active power mode on the BeanDevice®.
<u>TN RF 009 – « BeanGateway® management on LAN infrastructure »</u>	BeanGateway®	BeanGateway® integration on a LAN infrastructure
<u>TN RF 008 – “Data acquisition modes available on the BeanDevice®”</u>	All the BeanDevice®	Data acquisition modes available on the BeanDevice®
<u>TN RF 007 – “BeanDevice® DataLogger User Guide ”</u>	All the BeanDevice®	This document presents the DataLogger feature on the BeanDevice®
<u>TN RF 006 – “WSN Association process”</u>	All the BeanDevice®	Description of the BeanDevice® network association
<u>TN RF 005 – “Pulse counter & binary data acquisition on the BeanDevice® SUN-BN”</u>	BeanDevice® SUN-BN	This document presents Pulse counter (ex: energy metering application) and binary data acquisition features on the BeanDevice® SUN-BN.
<u>TN RF 004 - Ambient Light sensor technical specifications</u>	BeanDevice® SUN-XX (Ecosensor)	Technical description of the Ambient light sensor available on the BeanDevice® SUN-XX products
<u>RF TN 003- “Aggregation capacity of wireless sensor networks”</u>	All the products	Network capacity characterization of Beanair Wireless Sensor Networks
<u>RF TN 002 V1.0 - Current consumption in active & sleeping mode</u>	BeanDevice®	Current consumption estimation of the BeanDevice in active and sleeping mode
<u>RF TN 001 V1.0- Wireless range benchmarking</u>	BeanDevice®	Wireless range benchmarking of the BeanDevice®



4.3 RELATED VIDEOS



[All the videos are available on our Youtube channel](#)

<i>Beanair video link (Youtube)</i>	<i>Related products</i>
<i>Company Presentation</i>	<i>All</i>
<i>BeanGateway® - Ethernet Outdoor version introduction</i>	<i>BeanGateway® - Ethernet Outdoor version introduction</i>
<i>BeanGateway® – Ethernet Indoor version presentation</i>	<i>BeanGateway® Ethernet Indoor version</i>
<i>Beandevicé® AN-XX wireless range demonstration</i>	<i>BeanDevice® AN-XX & Beandevicé® AN-XX Extender</i>
<i>BeanDevice® AN-XX presentation</i>	<i>BeanDevice® AN-XX & Beandevicé® AN-XX Extender</i>
<i>BeanDevice® AX-3D presentation</i>	<i>BeanDevice® AX-3D</i>
<i>BeanDevice® HI-INC presentation</i>	<i>BeanDevice® HI-INC</i>
<i>BeanDevice® AX-3DS presentation</i>	<i>BeanDevice® AX-3DS</i>
<i>BeanDevice® SUN-T presentation</i>	<i>BeanDevice® SUN-T</i>
<i>BeanDevice® SUN-TIR presentation</i>	<i>Beandevicé® SUN-TIR</i>
<i>BeanDevice® SUN-BN presentation</i>	<i>BeanDevice® SUN-BN</i>
<i>BeanDevice® SUN presentation</i>	<i>BeanDevice® SUN</i>
<i>BeanScape® – WSN supervision software</i>	<i>BeanScape®</i>
<i>BeanGateway® Ethernet/LAN Configuration, directly connected to the Laptop/PC</i>	<i>BeanGateway®</i>
<i>Performing an energy scan on your BeanGateway®</i>	<i>BeanGateway®</i>
<i>Automatic RF Channel selection</i>	<i>BeanGateway®</i>
<i>Wireless sensors profile deletion from the BeanGateway® Database</i>	<i>All</i>
<i>Network Diagnostic configuration on the BeanGateway®</i>	<i>BeanGateway®</i>
<i>RF Power configuration on the BeanGateway®</i>	<i>BeanGateway®</i>



5. DOCUMENT ORGANIZATION

BeanGateway® product
presentation

- Details the BeanGateway® product presentation

BeanGateway® installation
guidelines

- Details the installation guidelines of the BeanGateway®

Starting your application

- Details the BeanGateway® supervision from the BeanScape®

Maintaining and supervising
your BeanGateway®

- Details the BeanGateway® maintenance (for experienced user)

Troubleshooting

- BeanGateway® FAQ

Environnemental Constraints

- Describes environmental constraints (temperature, humidity, mechanical chocs, vibration...)

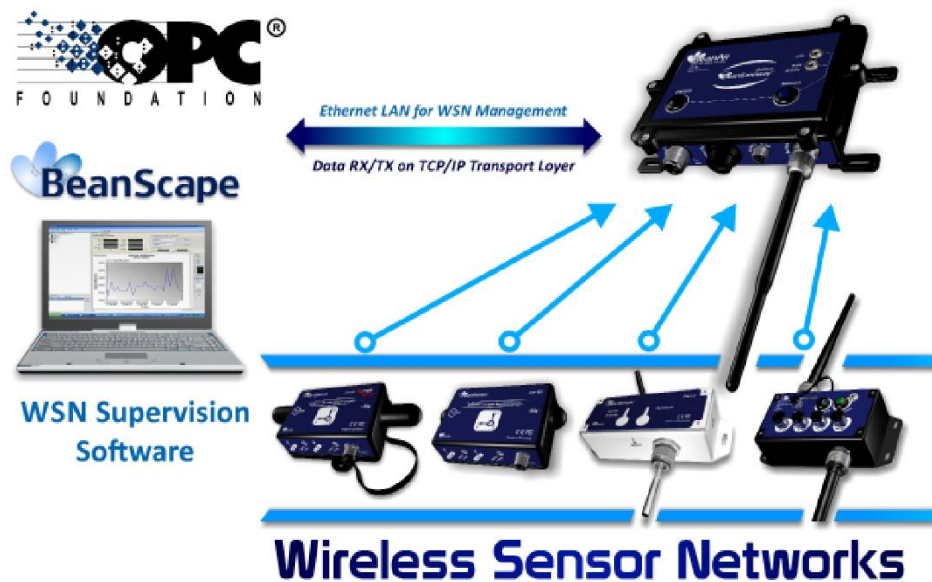


6. BEANGATEWAY® - PRODUCT PRESENTATION



- ✓ *It is highly recommended to read all the user manual related to BeanAir software & equipment (BeanScope®, BeanGateway®, BeanDevice®) before getting start your BeanGateway®.*
- ✓ *Use only accessories supplied by BeanAir (power supply unit, and antenna). Use of other materials may damage the BeanGateway®;*
- ✓ *Only BeanAir is qualified to make changes on the BeanGateway®;*
- ✓ *Don't try to remove the adhesive label on the product; it contains important information such as the MAC address*

6.1 PRODUCT OVERVIEW



The BeanGateway® is used to build and manage BeanAir wireless sensor networks. It can manage queues for every network element (BeanDevice®). As a gateway, it controls the external access to the network through a highly secured authenticated procedure. It supports the conversion of data exchanged, compression and IP connectivity with the network thereby reducing the intelligence required in these platforms, maintenance and therefore the associated cost.



It allows communication with the Wireless Sensors Network through IEEE 802.15.4 protocol. The BeanGateway® provides standard protocols for a better communication with a SCADA supervision software:

- ✓ **LAN/Ethernet**
- ✓ **GSM/GPRS**

The BeanGateway® comes in three models versions:

- ✓ **BeanGateway® GTW-Ethernet**
- ✓ **BeanGateway® GTW- GPS**

It offers the following features:

- ✓ Design, configuration and supervision of the entire Wireless sensors network.
- ✓ Data Organization from the various sensors.
- ✓ Data Transmission to the BeanScape®.
- ✓ Backing up wireless sensors network mapping.
- ✓ Information processing continuously even during a power outage.
- ✓ Data recording on Micro-SD card (option)



6.2 BEANGATEWAY® TECHNICAL SPECIFICATIONS

6.2.1 Common specifications

These specifications are common to all the BeanGateway® version (BeanGateway® ETH, BeanGateway® GSM/GPRS, BeanGateway® GSM/GPRS).

6.2.1.1 Wireless sensor network coordinator

Specifications	Wireless Sensor Network Coordinator	
Wireless Stack	IEEE 802.15.4	
WSN Topology	IEEE 802.15.4	Peer-to-peer/ Star
Antenna Diversity	Self-managed antenna diversity function	
Data rate	250 Kbits/s	
RF Characteristics	ISM 2.4GHz – 16 Channels	
RF Transmit power	Configurable transmit power: +0,5 dBm to +20 dBm	
Receiver sensitivity	-95,5 dBm to -101 dBm	
Encryption	AES 128 bits (integrated AES coprocessor)	
Maximum Radio Range	1 km (L.O.S.)	
WSN Diagnostic tool	<ul style="list-style-type: none"> · Energy Scan for choosing a suitable RF Channel · BeanDevice® PER (Packet Error Rate) calculation · LQI (Link Quality Indicator) between the BeanGateway® GSM/GPRS and the BeanDevice® · RF channels Blacklist 	



6.2.1.2 Ethernet/LAN Network

Specifications	Ethernet/LAN Network
Network/Transport Protocol	Client TCP/IP, UDP, DNS, DHCP
Data Link Protocol	Ethernet / Fast-Ethernet with auto-uplink (MDI/MDI-X auto) - IEEE 802.3x
IP Addressing	Dynamic (DHCP) or static
IP configuration	LAN parameters (DNS, DHCP, Keep Alive...) are configurable from the BeanScape® (RS232 Interface or UDP/Ethernet Interface).

6.2.1.3 Power supply

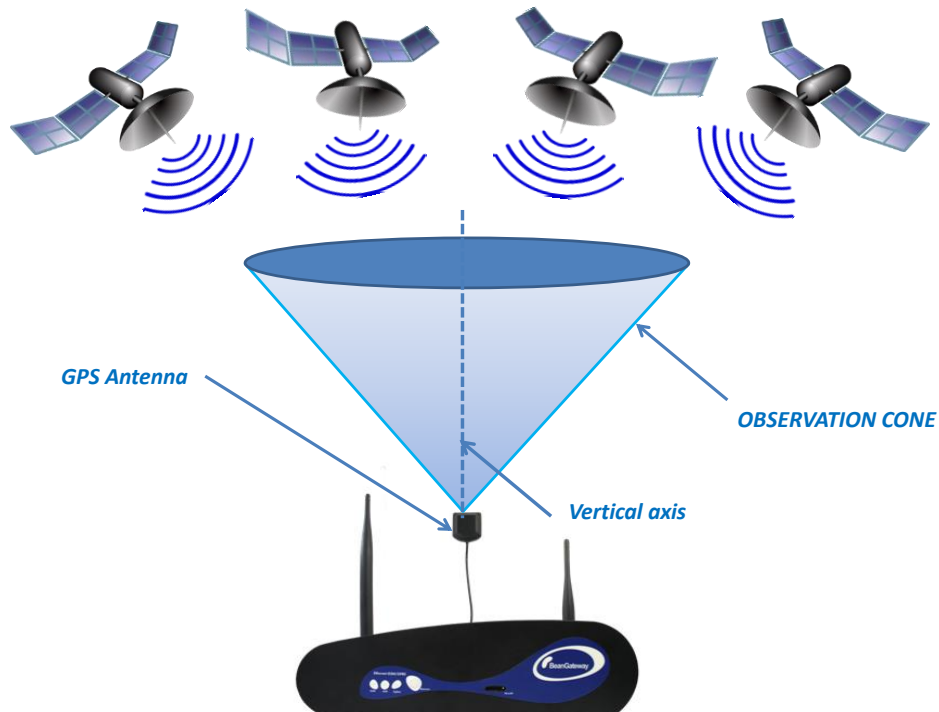
Specifications	Power Supply
Power Consumption	250 mA to 300 mA during wireless RX/TX and Ethernet activated
External power supply	+9V to +28 V , integrated Lithium-Ion battery charger with high-precision battery monitoring
Integrated Lithium-Ion Battery	Lithium-Ion rechargeable battery 950 mAh (reference BAT0.95DMG) In case of external power supply failure, the BeanGateway® can switch on the internal battery.

6.2.1.4 Embedded file system on Micro-SD® -Options

Specifications	Option(s)
Embedded File System on Micro-SD®	All the User data are stored on an external memory (Micro-SD® technology): <ul style="list-style-type: none"> · Measurement storage for Wireless Sensor Network (network configuration, measurement, alarms notifications ...) ; · Maximum storage capacity (2Go) · CSV files management (for exporting data on Excel® and Access®)



6.2.2 GPS Module (BeanGateway® GTW –GPS version)





Specifications	GPS Features
GPS Technology	SiRF Star 3 SBAS (WAAS & EGNOS) supported
Maximum refresh rate	1s
Frequency band	1575,42 MHz – 20 Channels
Sensitivity	High sensitivity for indoor use: -159 dBm (with an active antenna)
GPS Accuracy	+/- 2,5 meters
Startup time	Cold Start : < 35 seconds ; Warm Start : < 3 seconds
Amplified GPS Antenna	Antenne GPS active +28,5 dB V.S.W.R : 1.5:1 Noise Figure : 1.5 dB Cable Length : 3m Center frequency: 1575.42MHz $\pm 1.023\text{MHz}$ Polarization : RHCP Magnetic Mount
Operating Current	75 mA



6.3 CASING DESCRIPTION

The BeanGateway® casing comes in two versions:

Enclosure	Indoor Version	Outdoor version
		
Applications	<ul style="list-style-type: none"> ✓ Indoor application only, the product is not waterproof 	<ul style="list-style-type: none"> ✓ Remote sites (wind, water pipe, gas, mountains ...) ✓ Wireless Sensor Networks deployment in outdoor over long distances.
	<ul style="list-style-type: none"> ✓ Test Bench on mobile equipment (cars, trains, ...) ✓ With Geo-location of alarms events on a wireless sensor network (IEEE 802.15.4); ✓ Remote monitoring of cargoes 	

The BeanGateway® GPS integrates GPS function dedicated to test bench and telemetry applications on mobile equipment (train, car, ship).



6.3.1 BeanGateway® Indoor Version



Click on the following weblink to see the video: [BeanGateway® – Ethernet Indoor version presentation](#)

The BeanGateway® indoor has many buttons and connectors, let's see their meaning with illustrations

Front View



Micro-SD® Slot (Option)

CNC -Network push-button (factory settings restoration)

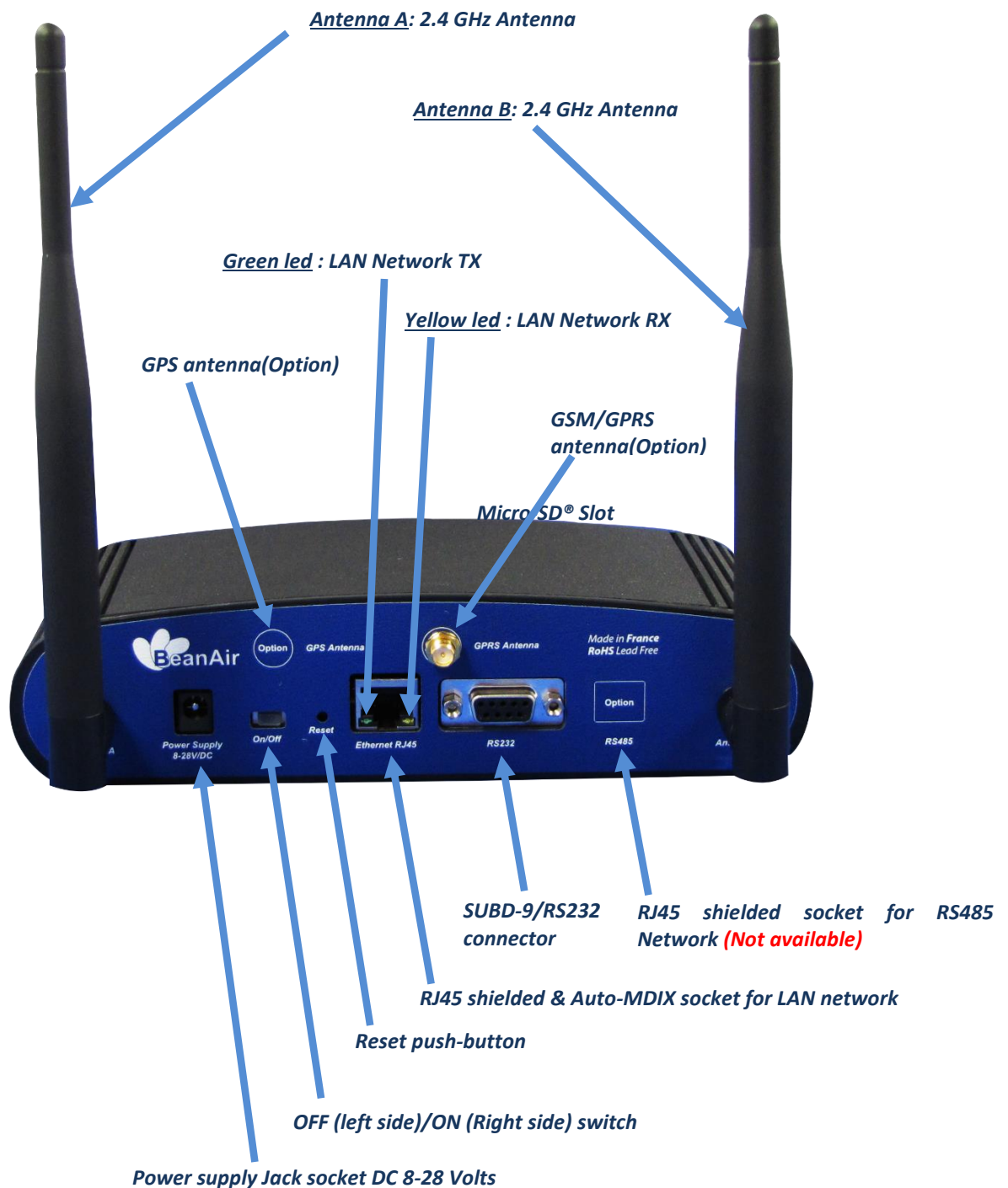
Wireless Sensor Network activity led

LAN Network activity led

GSM/GPRS or GPS or Modbus activity Led



Rear View

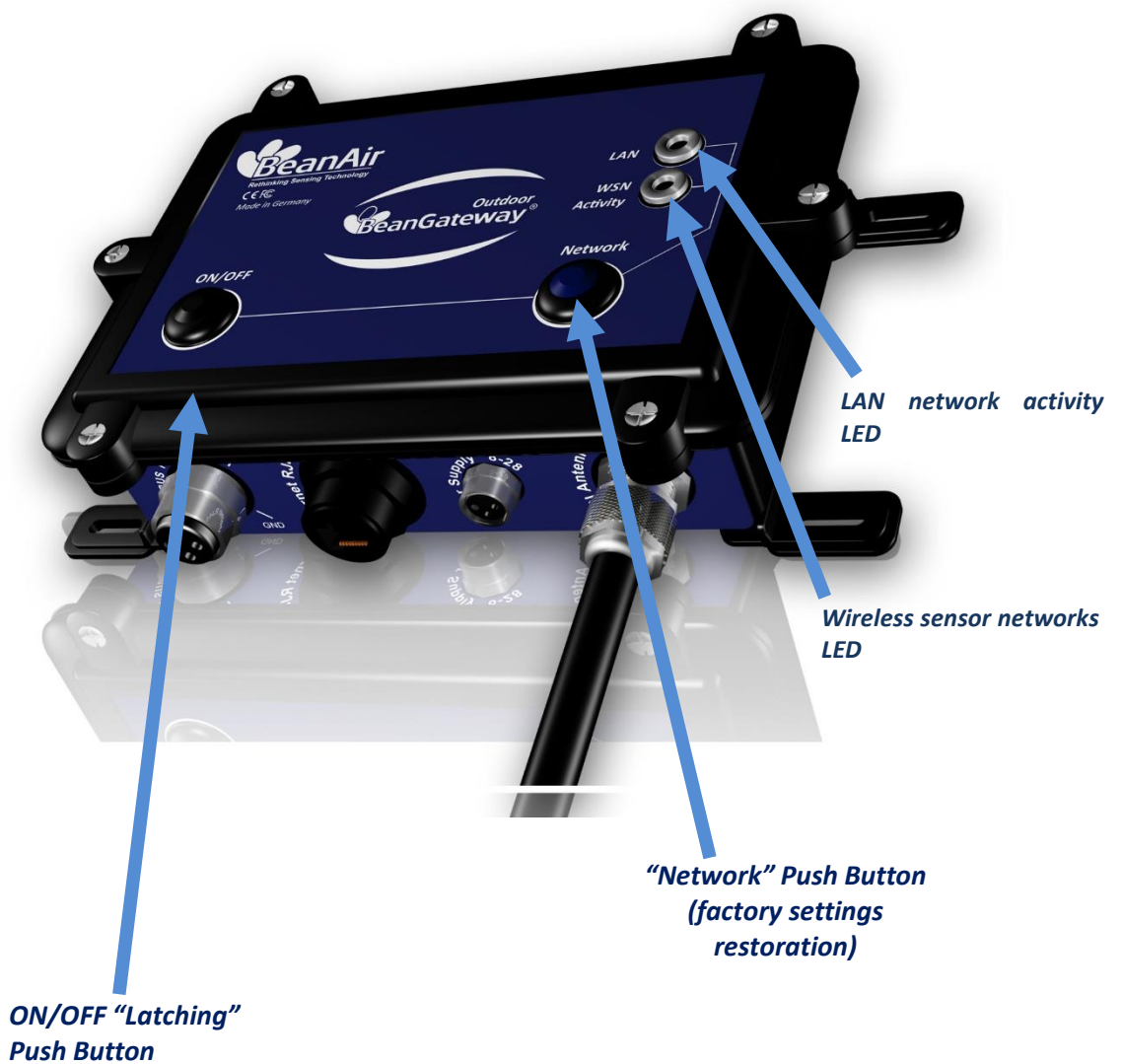


6.3.2 BeanGateway® Outdoor version



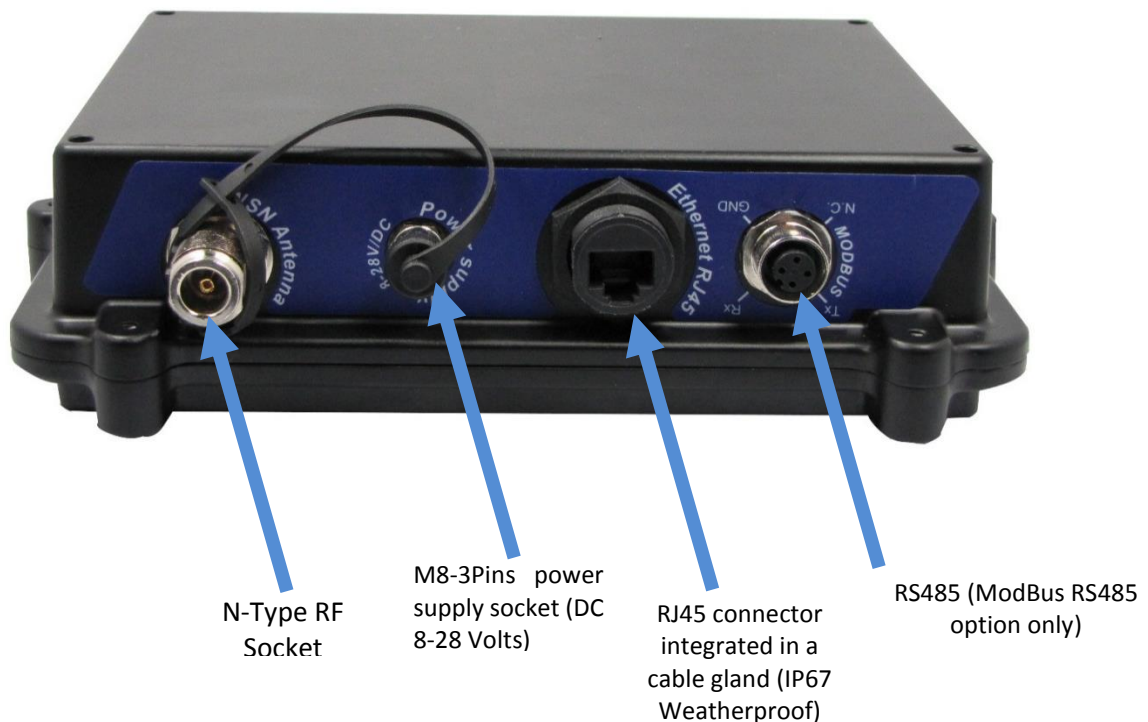
Click on the following weblink to see the video: [BeanGateway® - Ethernet Outdoor version introduction](#)

Front view



Function	Description
Network push button	<p>“Network” push button restores the factory settings.</p> <ul style="list-style-type: none"> Beandevic[®] profiles are deleted RF parameters are restored to the factory settings (TX power, Authorized RF channels, RF Channel) LAN/Ethernet parameters are restored to the factory settings <p>Hold this button more than 10 seconds, factory settings are restored when WSN activity Led starts to blink in red color.</p>
LAN network activity Led	This bi-color GREEN / RED Led represents the LAN activity
WSN activity Led	This bi-color GREEN / RED Led represents the WSN activity
ON/OFF Button	Allows to power up/power off the BeanGateway [®]

Rear view





To ensure an excellent seal of the BeanGateway® casing, please make sure that the following conditions are met:

- ✓ **During transportation, cable connections and locknuts could loosen , make sure they are tight**
- ✓ **Do not overtighten or exert force on your RJ45 cable or power cable**
- ✓ **If the external power supply is not used, make sure the power supply cap is present on the M8 socket;**
- ✓ **Make sure that all the N-Type antennas are tightly screwed;**
- ✓ **The external switch-mode power supply is not watertight;**



The BeanGateway® outdoor is delivered with a 2-meters length LAN/RJ45 cable. If the cable length is not enough for your application, use a RJ45 coupler (not provided with our material).

6.3.3 Led Description

Action	WSN Activity LED	LAN Network activity LED with DataLogging on Micro-SD® activtaed	GSM/GPRS Activity LED	Results / Impact
BeanGateway® Power ON	LED is flashing green	LED is fixed red and turn off by an interval of 15s and then turns back	LED is flashing green	The BeanGateway® is initialized and set up the mapping of its wireless network sensors
Press the RESET button	LED is flashing green	LED is fixed green and it turn off by an interval of 15s and then turns back	LED is flashing green	The coordinator is initialized (same action as above)
Data's reception from wireless sensor network	LED is flashing green	fixed green	LED is flashing green	Memorization, organization and data transmission to the network supervisor control monitor
Reception of configuration information from the BeanScape®	LED is flashing green	fixed green	LED is flashing green	Transmission of configuration information to the WSN



DataLogging
on the Micro-
SD

/

LED is flashing RED

/

/

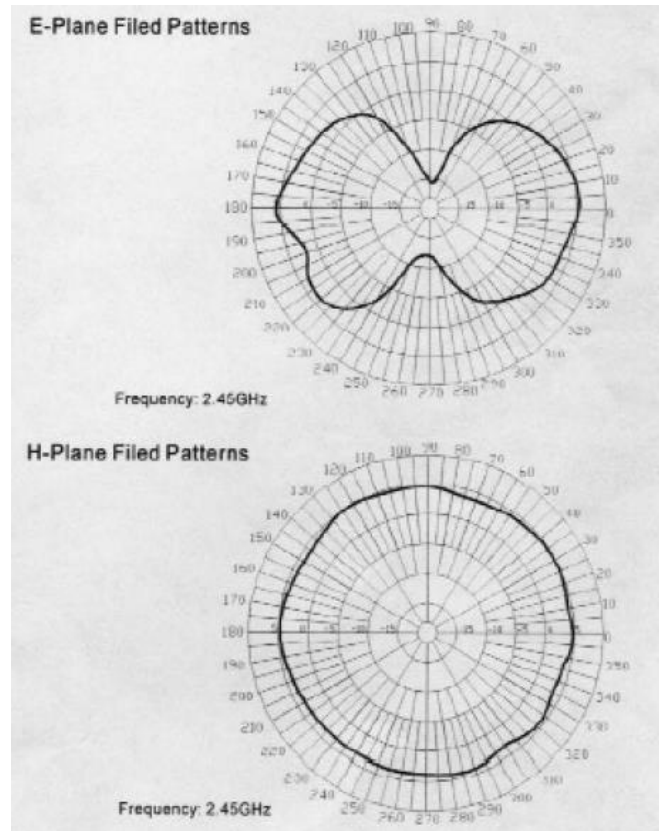
6.4 ANTENNA SPECIFICATIONS

6.4.1 2.4 GHz – Indoor Antenna

RF antenna specifications	
Power Gain	5.5 dBi
V.S.W.R.	<2.0
Connector type	RP-SMA (female)
Impedance	50 Ohm
Polarization	Vertical
Dimensions (Length & Diameter in mm)	200 x 14



6.4.1 2.4 GHz – Outdoor Antenna



<i>RF antenna specifications</i>	
Power Gain	5.5 dBi
V.S.W.R.	<2.0
Connector type	N-Type male
Impedance	50 Ohm
Resistance to wind	180 mph
Sealing	IP67
Polarization	Vertical
Dimensions (Length & Diameter in mm)	95 x 19



6.4.2 GPS Antenna (available only on the BeanGateway® GPS)

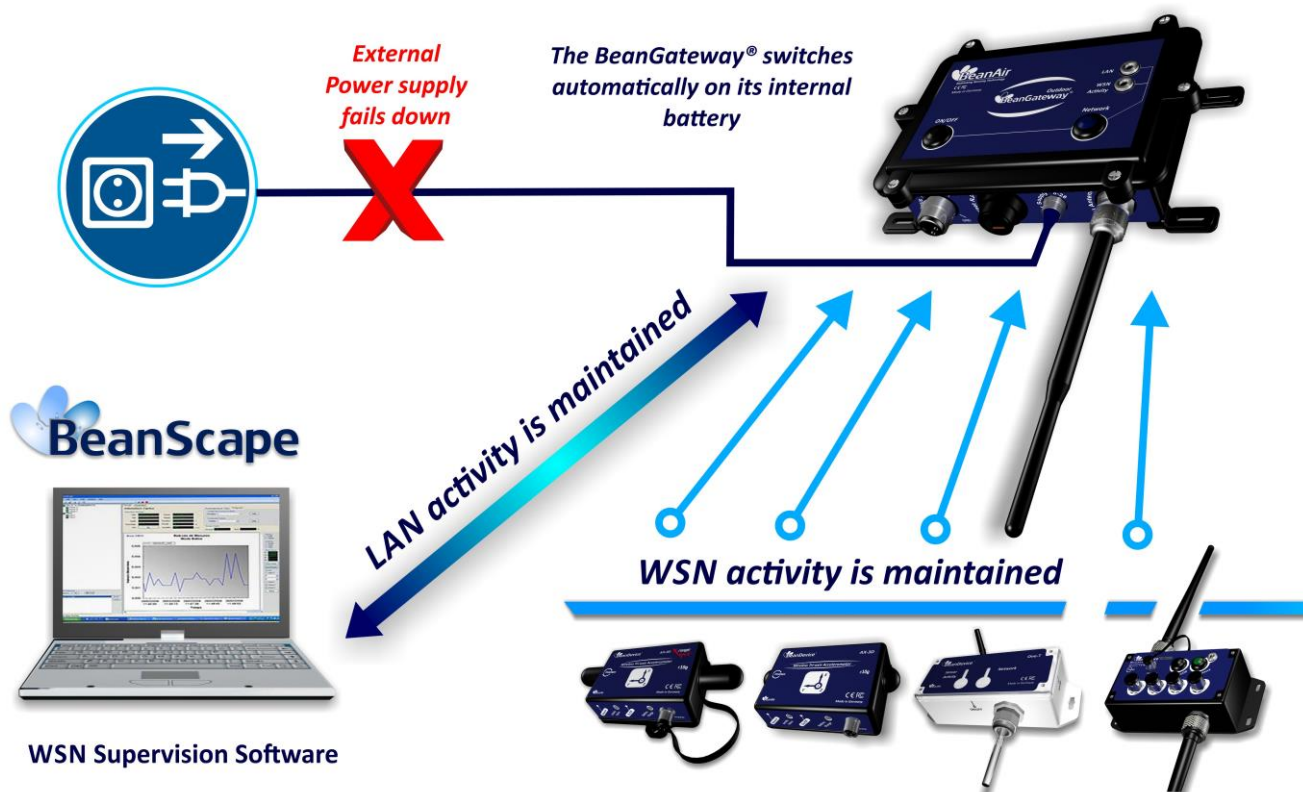
GPS antenna specifications	
Power Gain	28.5 dB
V.S.W.R.	1.5:1
Noise figure	1.5 dB
Cord length	3 meters
Centre Frequency	1575.42MHz ± 1.023MHz
Sealing	IP67
Polarization	RHCP
Mounting	Magnetic mounting



6.5 INTEGRATED UPS (UNINTERRUPTIBLE POWER SUPPLY)

The BeanGateway® operates with an external power supply (DC 8-28V). An integrated rechargeable battery with a capacity of **950mAh** is used as an UPS battery (uninterruptible power supply). The internal battery provides instantaneous protection from external power supply interruptions, the wireless sensor network activity & Ethernet LAN activity are maintained during this time (**3h00 to 3h30 approximately**). The **BeanGateway®** starts emitting a beep sound every 2 seconds. The beep sound will stop when the external power supply is restored.





Precautions:

- ✓ **Do not try to change the internal battery. You will void the warranty of your BeanGateway®.**
- ✓ **Use the power supply wall plug-in provided by Beanair®.**



Beep sound is only available on the BeanGateway® Indoor version



6.6 SERIAL LINE SPECIFICATIONS (RS232/RS485)

6.6.1 RS232 Line (BeanGateway® Indoor only)

6.6.1.1 Technical features



RS232 is only available on the BeanGateway® Indoor, this feature is not available on the BeanGateway® Outdoor

Features	Description
Baud Rate	Default Value : 19,2 Kbps Minimum value: TBD Maximum value : 115,2 Kbps Configurable from the BeanScape® software
Connector	SUBD9
Percent error between desired and actual baudrate.	0% - between 50Hz and 4800 bauds <0,16% -- between 7200Hz and 115,2 Kbauds
ESD Protection	+15kV

6.6.1.2 Wiring code



Features	Description
PIN 1	Not used
PIN 2	<i>RX Data (DTE), TX Data (DCE)</i>
PIN 3	<i>TX Data (DTE), RX Data (DCE)</i>
PIN 4	Not used
PIN 5	<i>Signal ground</i>
PIN 6	Not used
PIN 7	Not used
PIN 8	Not used
PIN 9	Not used





RTS and CTS signals are not used

Each TXD must be wired with RXD of the other device

RTS may be wired with CTS of the other device,

DTR may be wired with DSR of the other device.

6.6.2 RS485 Line

6.6.2.1 Technical features

Features	Description
Data Rate	Default Value : 19,2 Kbps Minimum value: 9,6 kbps Maximum value : 115,2 Kbps Configurable from the BeanScape® Manager or ModBus Command
Baud Rate accuracy	1% in transmission situation Accept 2% in reception situation
Connector type	BeanGateway® Indoor RJ45
	BeanGateway® Outdoor M12 – 4 Pins (Waterproof IP67)
Switchable Termination	120 Ohm termination resistor
ESD Protection	+15kV

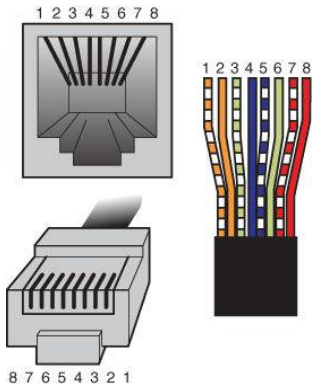
6.6.2.2 Switchable termination

Proper cable termination is very important for good signal fidelity. If the cable is not terminated with its characteristic impedance, reflections will result in distorted waveforms.

The RS485 Bus on the BeanGateway® integrates a switchable termination resistors on the receiver input pins. This provides the advantage of being able to easily change, through logic control, the line termination for optimal performance when configuring your ModBus network.

6.6.2.3 RJ45 Wiring code (BeanGateway® Indoor version)





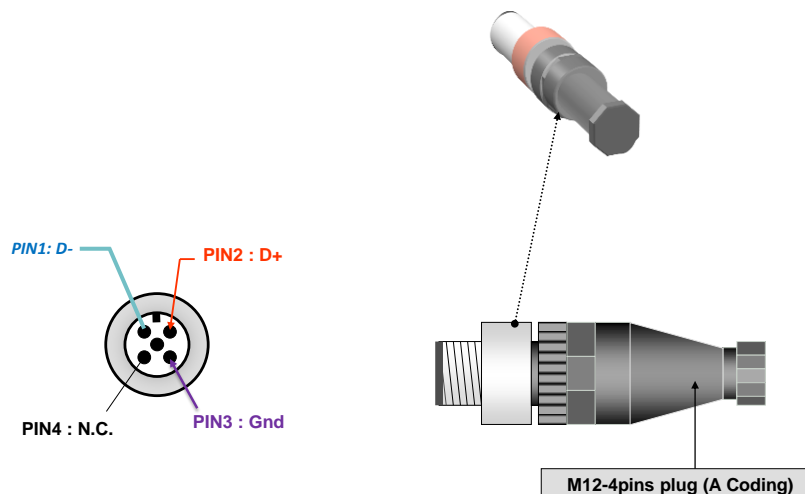
Pin Number	Wire color	Function	Description
PIN1	Orange/White		
PIN2	Orange		
PIN3	Green/White		
PIN4	Blue		
PIN5	Blue/White		
PIN6	Green		
PIN7	Brown/White		
PIN8	Brown		

6.6.2.4 M12-4 Pins Plug Wiring code (BeanGateway® Outdoor version)

A M12 Plug is provided with your BeanGateway® outdoor (if RS485 option is selected), Pin assignment follows M12 standard.

Pin Number	Function	Label name	Description
PIN1	D-		
PIN2	D+		
PIN3	Gnd		Electrical Ground
PIN4	Not connected		

M12-4Pins Plug – Wiring Code



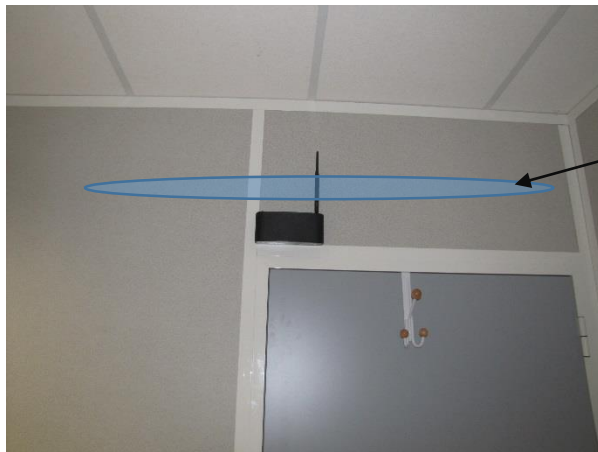
7. BEANGATEWAY® INSTALLATION GUIDELINES

7.1 HOW TO INSTALL THE BEANGATEWAY®

7.1.1 Wall mounting

For a better wireless link, we recommend to mount the BeanGateway® on a wall/mast above 2-3meters from the ground.

If your WSN is deployed on the same floor, the RF antenna should be mounted vertically.



Dipole antenna radiation pattern

Figure 1: A BeanGateway® indoor mounted on a wall

If your WSN is deployed on the same floor, a horizontal position of the antenna will decrease the RF signal.





For further information about WSN deployment guideline, Read the following technical note:
[TN RF 009 – « BeanGateway® management on LAN infrastructure »](#)

7.1.2 Desktop installation

The BeanGateway® indoor version can also be installed on your desktop, the RF Antenna should be mounted vertically.



If your WSN is deployed on the same floor, a horizontal position of the antenna will decrease the RF signal.



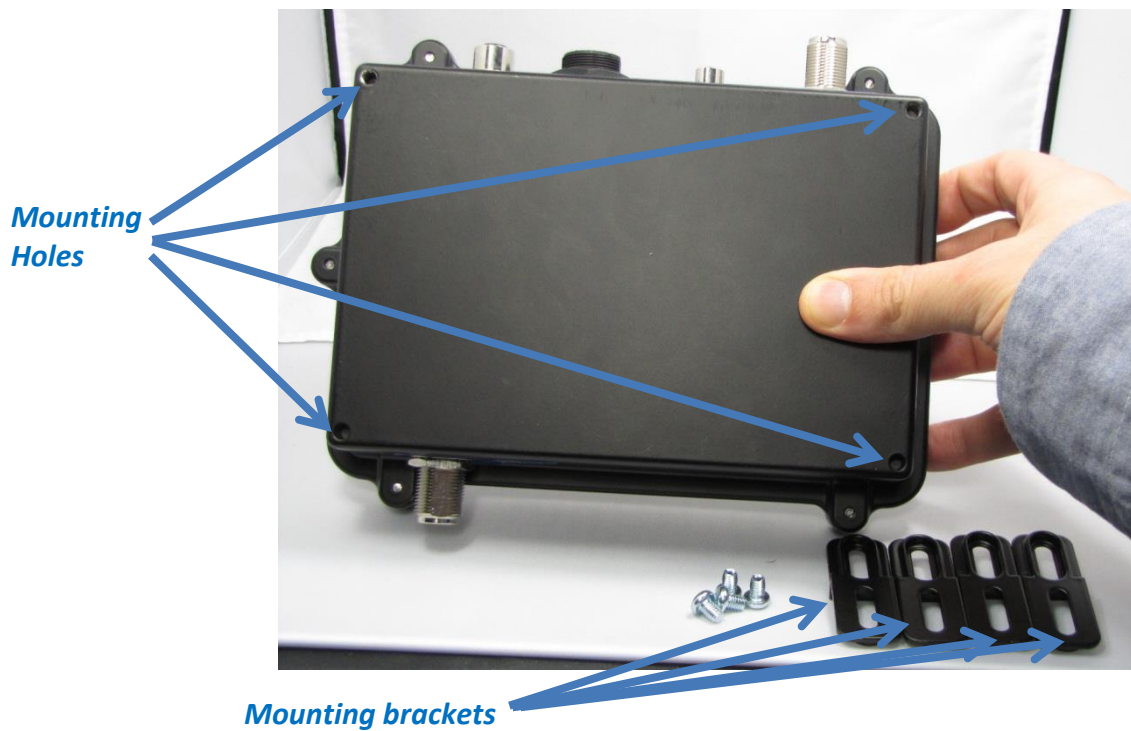
7.1.3 Wall mounting kit for the BeanGateway® outdoor

7.1.3.1 Die cast external mounting brackets

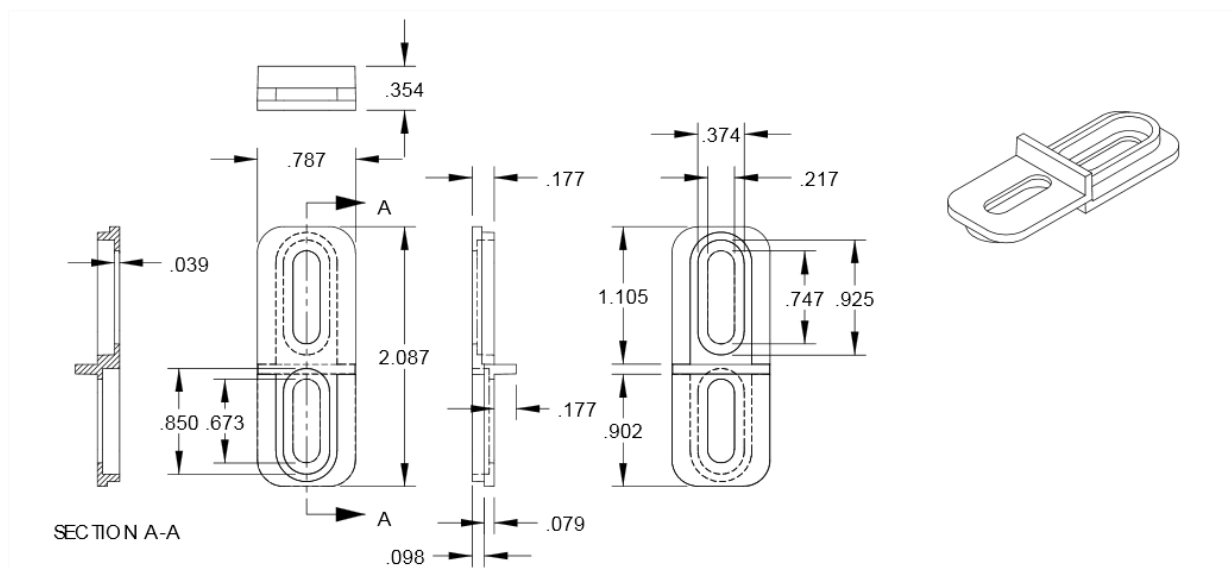
The BeanGateway® outdoor is provided with die cast external mounting brackets (4 x brackets and 4 x M5 attaching screws)

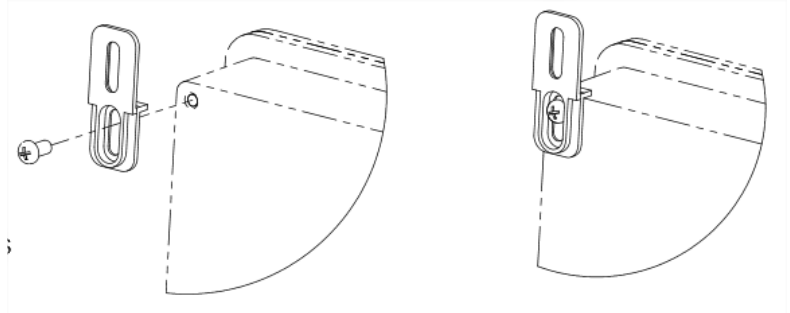
External mounting brackets enable the BeanGateway® outdoor to be wall or panel mounted without opening the box.





7.1.4 Mounting brackets design





7.1.5 Plug the 2.4GHz antenna



- ✓ *The BeanScape® provides a Wireless Network Diagnostic tool (Real-Time PER & LQI estimation, Energy Scan on RF Channels) allowing the user to evaluate the RF Link between the BeanDevice® and the BeanGateway®.*
- ✓ *Only the hardware version V3.4 of the BeanGateway® comes with antenna diversity.*

The antenna socket used on the BeanGateway® (indoor) is a RPSMA (Reverse polarity SMA) type, this type of antenna is a standard for indoor application.

Plug your RF antenna on the antenna socket of your BeanGateway® (clockwise). Do not force on the connectors.



Antenna socket (RPSMA)



Don't try to plug another type of antenna on your Beangateway®, you will damage the connectors.



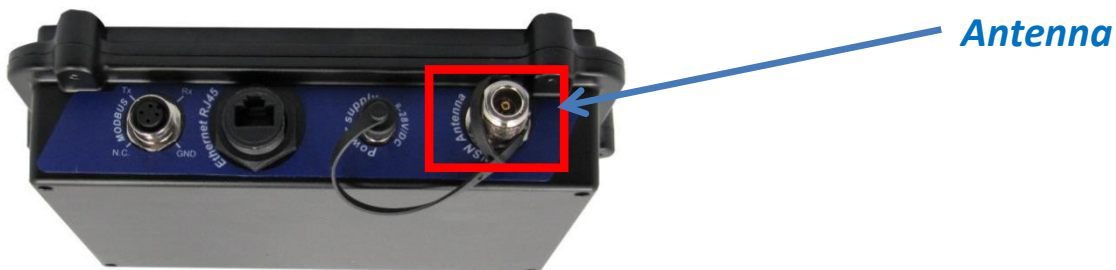
7.1.5.1 BeanGateway® outdoor version



Click on the following weblink to see the video: [BeanGateway® - Ethernet Outdoor version introduction](#)

The antenna socket used on the BeanGateway® is a N-Type antenna, this type of antenna is a standard for outdoor application.

Plug your RF antenna on the antenna socket of your BeanGateway® (clockwise). Do not force on the connectors.



Don't try to plug another type of antenna on your Beangateway®, you will damage the connectors.

7.2 POWER SUPPLY SOCKET WIRING

The **BeanGateway®** operates with an external power supply (DC 8-28V). An integrated rechargeable battery with a capacity of **950mAh** is used as an UPS battery (uninterruptible power supply). The internal battery provides instantaneous protection from external power supply interruptions, the wireless sensor network activity & Ethernet LAN activity are maintained during this time (**3h00 to 3h30 approximately**).



If you use another type of DC power supply, you will damage your BeanGateway®:

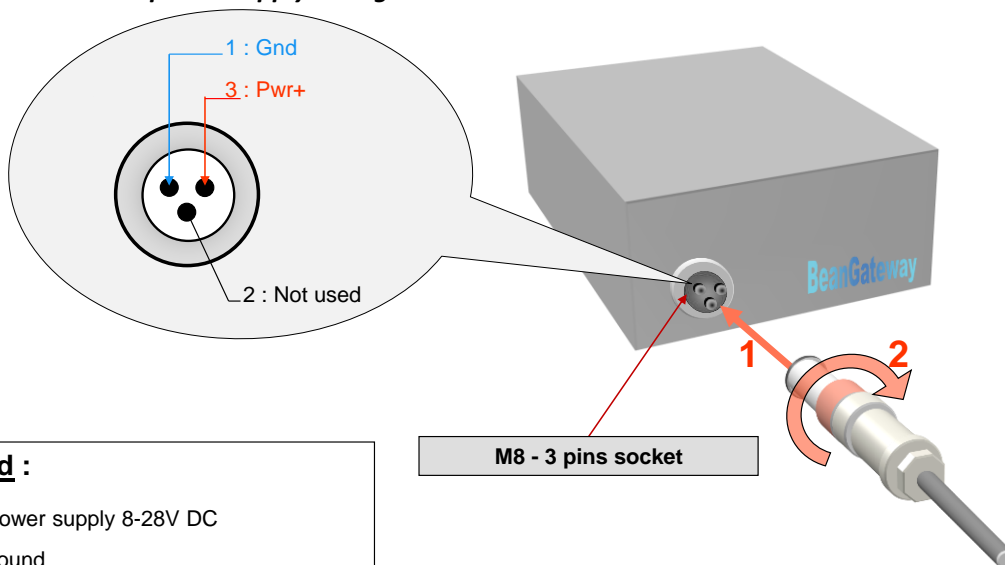
- ✓ **If you inverse the power supply polarity;**
- ✓ **If the maximum supply voltage value is exceeded (28V);**



7.2.1 BeanGateway® outdoor power supply

The Beangateway® Outdoor version integrates a M8-3P socket. The AC-DC power supply adapter is provided with a M8-3P plug.

External power supply wiring code



Legend :

Pwr+ : Power supply 8-28V DC

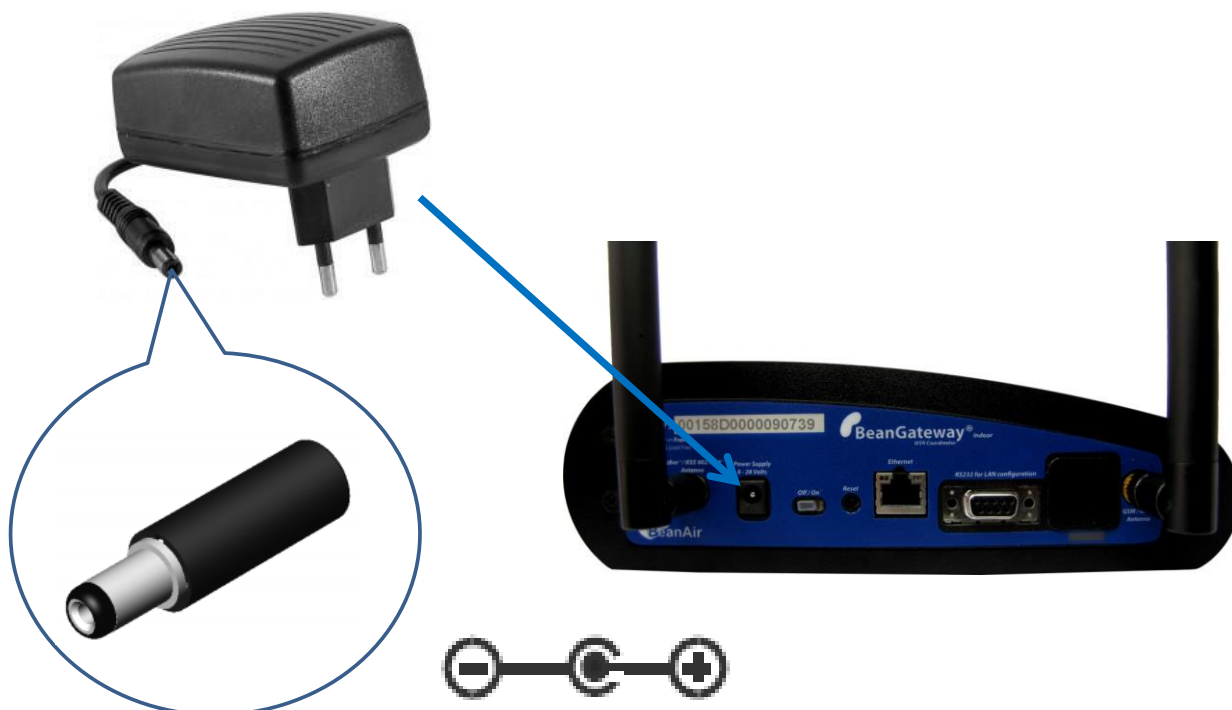
Gnd : Ground

7.2.2 BeanGateway® indoor power supply

It's highly recommended to use your BeanGateway® with the DC power supply bloc provided with the BeanGateway®.

If it's needed to power supply the BeanGateway® with another type of DC power supply, the user must refer to the polarity:





Jack connector 2,1mm (Int) / 5.1 mm (ext)



7.3 DATA LOGGER MODULE (MICRO-SD®)

7.3.1 Introduction

The Micro SD® option on the BeanGateway® can record measurements from the BeanGateway® on a micro SD Card. This function is useful in applications where the user cannot afford to lose measurement data, or in case of a temporary loss of network connection (local or remote) the measurement data is stored on the optional MicroSD of the BeanGateway®. In other embedded applications, where there are no possibilities of connecting your devices with an IT Environment, this will become a mandatory feature.

The Micro SD Data Logger on the BeanGateway® should not be confused with the embedded Data Logger on the BeanDevice®.



Data logging on Micro-SD® is not compatible with the following data acquisition mode:

- ✓ *Streaming Mode*
- ✓ *Streaming Packet Mode*
- ✓ *SSD (Smart shock detection)*

7.3.2 How to insert a Micro-SD® card on your Beangateway®?

A Micro-SD® card is provided with the BeanGateway® (the max capacity is 2Go), and a card adapter.



Micro-SD® card and its SD adaptator



Use only Micro-SD® card. Don't try to insert SD Card on your BeanGateway®. You risk to damage your BeanGateway®.





SD® Card



Micro-SD® Card

The Micro-SD® slot is on the front side of the BeanGateway® case:



Micro-SD® Slot

The following steps show how to insert a Micro-SD® card and to start DataLogging on your BeanGateway®:

Step 1

- Power off the BeanGateway®
- Slide the Micro-SD® card into the card slot, with the label side face up.

Step 2

- Power-On your BeanGateway®
- Start the BeanScape® and get to the Logger window

Step 3

- To configure the Logger on your BeanGateway®, go to the chapter "DataLogging on MicroSD"





When DataLogging is enabled on your BeanGateway®, don't try to remove the Micro-SD® card. You will lose all the data recorded on your Micro-SD® during a write/read operation. If you want to remove properly the Micro-SD® card, firstly power off your BeanGateway®.



Do not expose your Micro-SD® card in a place subject to electro-static discharge and/or electrical noise.



If your Micro-SD® card is damaged, you should change it. The BeanGateway® can not read/write on Micro-SD® HC Card which is generally used on Digital Camera video (High Capacity).

7.3.3 Functions

The BeanGateway® logger, allows backing up of your measurement data on an optional memory card (micro SD Card).

When the logger mode is enabled, all the measurement data transmitted by the BeanDevice® are stored on the memory card.



This option is not available with the Streaming, Streaming Packet and SSD (Smart shock detection) measurement mode.

7.3.4 Common Files on the memory card

7.3.4.1 Organization of Files

A file is created by your BeanDevice® in the root directory of the memory card. The format of the file name is: "MXXXXXX.blg" where X are the last six characters forming the corresponding MacID of your BeanDevice®.

Example: for a BeanDevice® MacID which is "0x00158D00000AAA02" then the created file on the memory card will be "M0AAA02.BLG"



7.3.4.2 Type of file created on the memory card

Data stored on the memory card is formatted as raw data. That is to say that the generated files are not directly readable as it is. An application is required to convert them into text file.

This application is the "raw BeanGateway log parser."

7.3.5 Using the Data converter application (from raw file to text file)

7.3.5.1 Location of the converter

The conversion application can be found in the directory where the executable BeanScape "BeanScape.exe" file is found.

By default, the install location path would be "C: \ Program Files \ BeanScape."

The executable file can be identified by the name "AppliBeanRawLogConverter.exe."

The complete path is "C: \ Program Files \ BeanScape \ AppliBeanRawLogConverter.exe" (if it is a default installation).

7.3.5.2 How to use the conversion application?

Once the application is launched, it is very easy to use:

- ✓ Click on "Open Raw Log File" (to open the raw log file)
- ✓ A dialog box prompts you to select the log file from the SD card of the BeanGateway (file ending with the extension "*. blg")
- ✓ Once done, the first information displayed in the application window
 - At the top (table) are the general information about the BeanDevice and sensors connected to it. (MacID, number of sensors, sensor technology, measuring range, ...)
 - In the lower part (text box) are the unconverted measurements and the dates involved, and at the end of the text are information on the data of extraction
 - This is an optional information.
- ✓ The last step is to generate log files ending in text format by clicking on the button "Generate readable log text file"
- ✓ A dialog box prompts you to select the destination folder where the files will be created text log. ().
- ✓ A message prompts you saying that the operation is complete.



Warning: Newly generated files will overwrite the old files in case they have the same name.



Application for conversing raw logs

081210_1933_cplxHeader_M0AAA02.BLG - BeanGateway raw log file parser - BeanAir app...

Open Raw Log File Generate readable log text file

MacId	00158D00000AAA02			
NetId	0001			
ParId	3AAB			
Platform Techno.	HPI 2D			
Sensor Count	1			
Sensor Id	0	1	2	3
Sensor Techno	High Precision Inclinometer 2D	NA	NA	NA
Extra Info	[-15;+15] deg.	NA	NA	NA
1st Ratio	1	0	0	0
1st Offset	0	0	0	0
2nd Ratio	0	0	0	0
2nd Offset	0	0	0	0

166 : 06/12/2010 12:42:37
 SensId: 0.RawMeasure: 39747
 194 : 06/12/2010 12:42:38
 SensId: 0.RawMeasure: 32767
 222 : 06/12/2010 12:42:39
 SensId: 0.RawMeasure: 32767
 250 : 06/12/2010 12:42:40
 SensId: 0.RawMeasure: 32767
 278 : 06/12/2010 12:42:41
 SensId: 0.RawMeasure: 32767
 306 : 06/12/2010 12:42:42
 SensId: 0.RawMeasure: 32767
 334 : 06/12/2010 12:42:43
 SensId: 0.RawMeasure: 32767
 362 : 06/12/2010 12:42:44
 SensId: 0.RawMeasure: 32767
 390 : 06/12/2010 12:42:45
 SensId: 0.RawMeasure: 32767
 418 : 06/12/2010 12:42:46
 SensId: 0.RawMeasure: 32767
 446 : 06/12/2010 12:42:47
 SensId: 0.RawMeasure: 32767
 474 : 06/12/2010 12:42:48
 SensId: 0.RawMeasure: 32767
 502 : 06/12/2010 12:42:49
 SensId: 0.RawMeasure: 32767
 530 : 06/12/2010 12:42:50
 SensId: 0.RawMeasure: 32767
 558 : 06/12/2010 12:42:51
 SensId: 0.RawMeasure: 32767
 586 : 06/12/2010 12:42:52
 SensId: 0.RawMeasure: 32767
 614 : 06/12/2010 12:42:53
 SensId: 0.RawMeasure: 32767
 642 : 06/12/2010 12:42:54
 SensId: 0.RawMeasure: 32767
 670 : 06/12/2010 12:42:55
 SensId: 0.RawMeasure: 32767
 698 : 06/12/2010 12:42:56
 SensId: 0.RawMeasure: 32767
 726 : 06/12/2010 12:42:57
 SensId: 0.RawMeasure: 32767
 754 : 06/12/2010 12:42:58
 SensId: 0.RawMeasure: 32767
 782 : 06/12/2010 12:42:59
 SensId: 0.RawMeasure: 32767
 810 : 06/12/2010 12:43:00
 SensId: 0.RawMeasure: 32767
 838 : 06/12/2010 12:43:01
 SensId: 0.RawMeasure: 32767



7.3.6 Log text files generated by the application

The log text files generated by the application are those generated by the BeanScape. Individual log files are created for each sensor. The format of the file name is: "0XXXXXXXXXXXXXXXXX_Y.txt" where X represents the character 16 characters of the MacID BeanDevice, and character Y is the sensor ID question.

Once the logs are processed, the measurements are converted into their own unit, for example in the case of a temperature sensor, the measure will be expressed in degrees Celsius (° C).

Example: A BeanDevice TH (humidity - temperature) having sensors attached: a humidity sensor and a temperature sensor, the MacID is "0x0011223344556677" Ids and associated sensors are respectively "0" and "1". After the log of several measures of the BeanDevice on the memory card of the BeanGateway, you will see that the file generated with the name "M556677.blg." Once this file is converted by the conversion application, two log files are generated in text format. "0x0011223344556677_0.txt" the log file of the humidity sensor and "0x0011223344556677_1.txt" the log file of the temperature sensor .

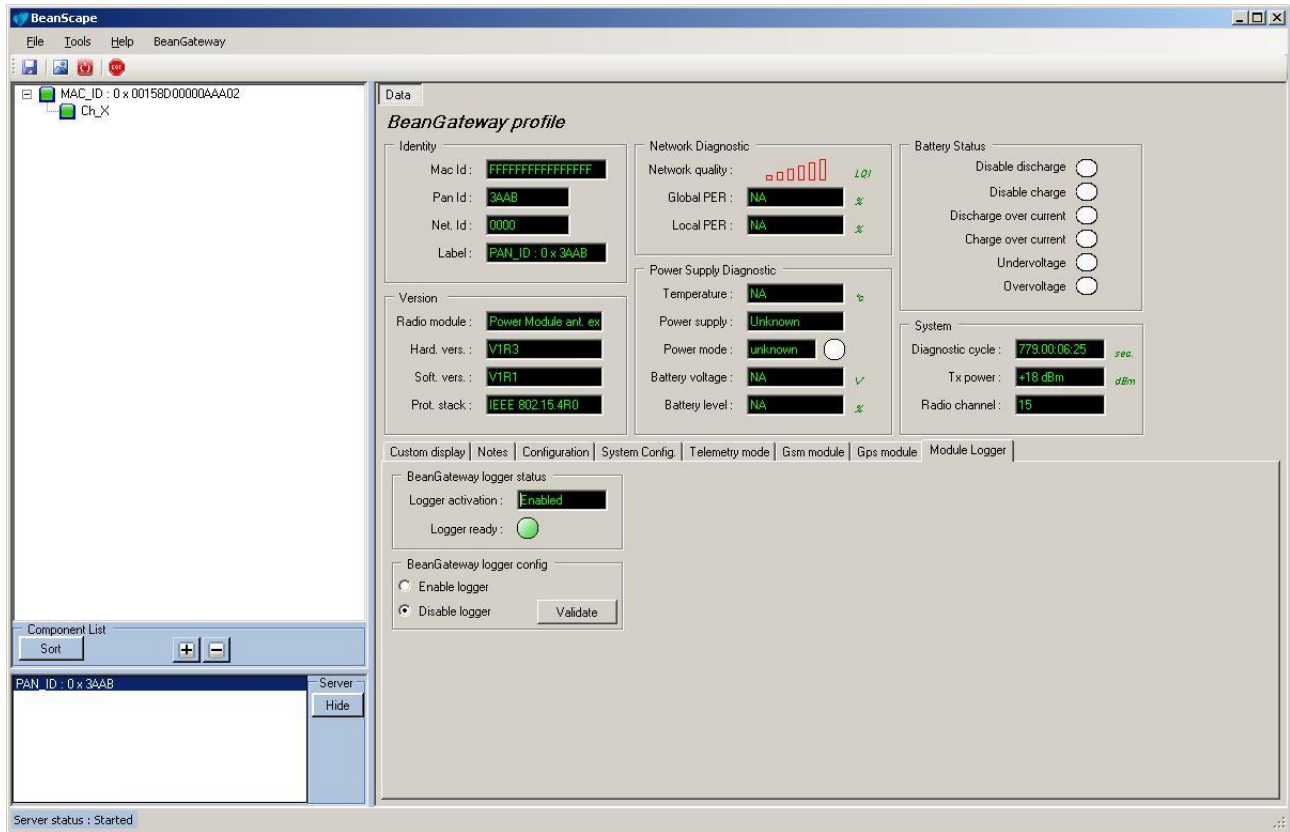
7.3.6.1 Controlling the MicroSD Data Logger of the BeanGateway using the BeanScape

From the BeanGateway profile, you can access the tab "Logger Module." Under that you will find two fields.

- The first field identifies the current state of embedded logger:
 - ✓ The field "**Logger status**" indicates whether the logger is currently enabled or not.
 - ✓ The field "**Logger ready**" indicates whether the logger is currently operational (green when operational, if not red). The LED will be red if no memory card is present in the BeanGateway, or if the module initialization logger is not yet complete.
- The second field allows you to enable or disable the onboard logger:
 - ✓ Select "Enable log" and click "Validate" to activate the logger.
 - ✓ Select "Disable log" and click "Validate" to disable the logger.



BeanScope Application : "Logger Module" Tab



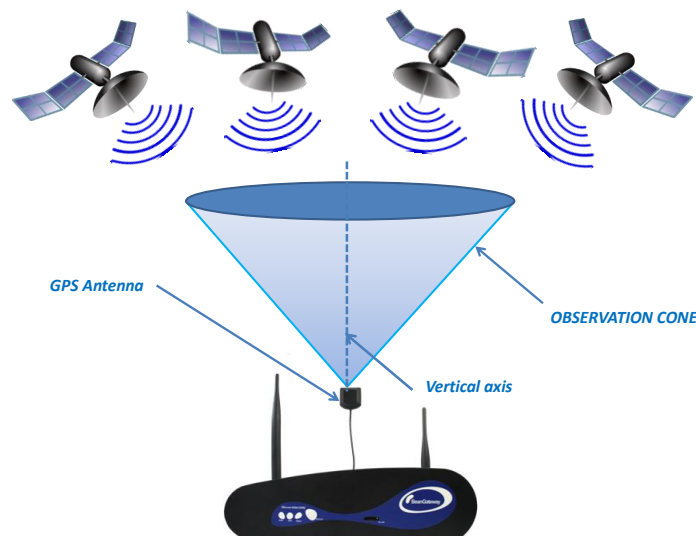
Once the Logger mode is enabled, do not remove your Micro-SD® before switching off your BeanGateway®. If you remove your card Micro-SD® during the writing phase, the Micro SD may get corrupted and you may lose all the measurements stored in it.



7.4 HOW TO MOUNT YOUR GPS ANTENNA (AVAILABLE ONLY ON BEANGATEWAY® GPS) ?

The antenna must be located in place with direct view of GPS satellites. Usually the best place is on the roof with a clear view of the sky and free of obstructions such as other buildings. It is important to avoid proximity with high power transmitter which could radiate energy at GPS L1 frequency (1575.42 ± 1.023 MHz).

Usually the exact coordinates of GPS antenna is unknown and the GPS timing receiver will determine this location automatically. In that nominal case a proper sky visibility is required: a vertical observation cone in open view of a semi-angle higher or equal to 65° (optimum at 85°) is recommended.



Don't mount your GPS antenna on metallic walls, your GPS antenna will not work



8. START YOUR APPLICATION

8.1 CONNECT YOUR BEANGATEWAY® TO YOUR PC/LAPTOP

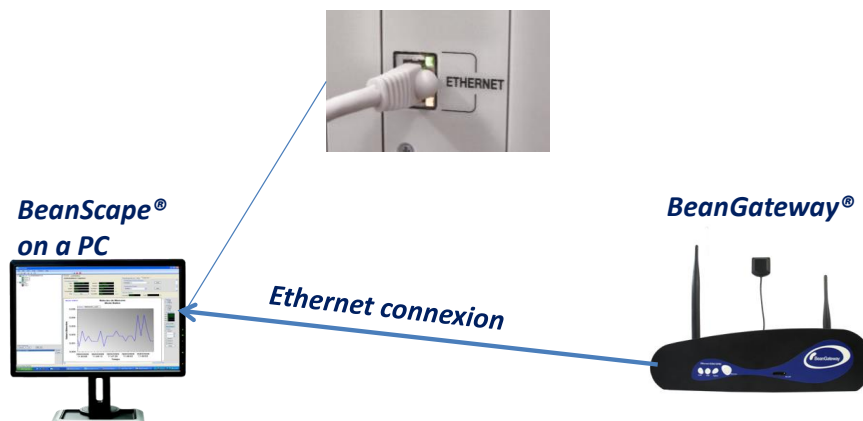


For further information about LAN Network configuration:

- Read the following technical note: [TN RF 009 – « BeanGateway® management on LAN infrastructure »](#)



- Click on the following web link to see the video: [BeanGateway® Ethernet/LAN Configuration, directly connected to the Laptop/PC](#)



To view the entire wireless sensor network from your **BeanScape®**, you must firstly connect your **Beangateway®** to a PC where the **BeanScape®** is already installed. Connection is established through an Ethernet cable.

Make sure:

- ✓ Ethernet cable is connected to both your PC and **BeanGateway®**
- ✓ **BeanGateway®** is powered and in "ON" position.
- ✓ **BeanScape®** is installed on your PC



- ✓ *No antivirus/firewall is blocking the Network activity between the BeanGateway® and the BeanScape®*



For further information on how to install the BeanScape®, please read the BeanScape® User Manual.

8.2 SETTING UP A NETWORK ON YOUR COMPUTER

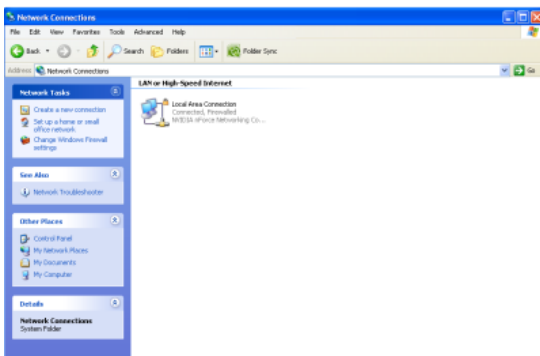
To configure the network on your computer/workstation:

- ✓ Click on 

- ✓ Then on  Control Panel



- ✓ Double-click on
- ✓ You will see the following window



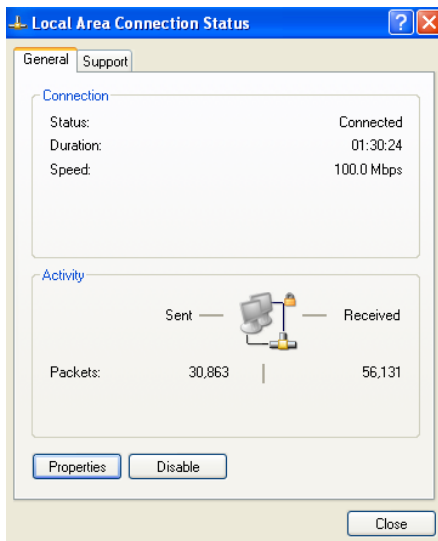
- ✓ Select the icon corresponding to the (NIC) network interface card on what you connected the

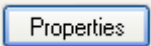


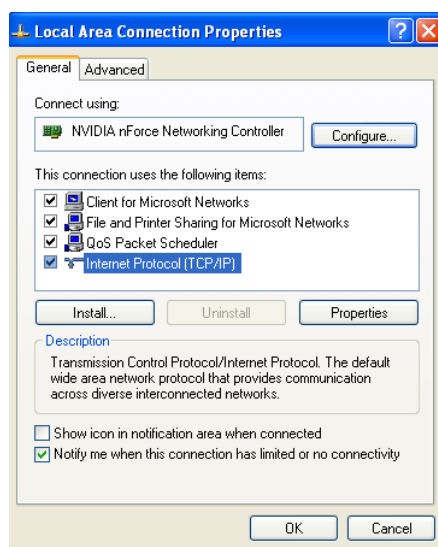
BeanGateway®

- ✓ Double-click the icon.
- ✓ You get the following window:



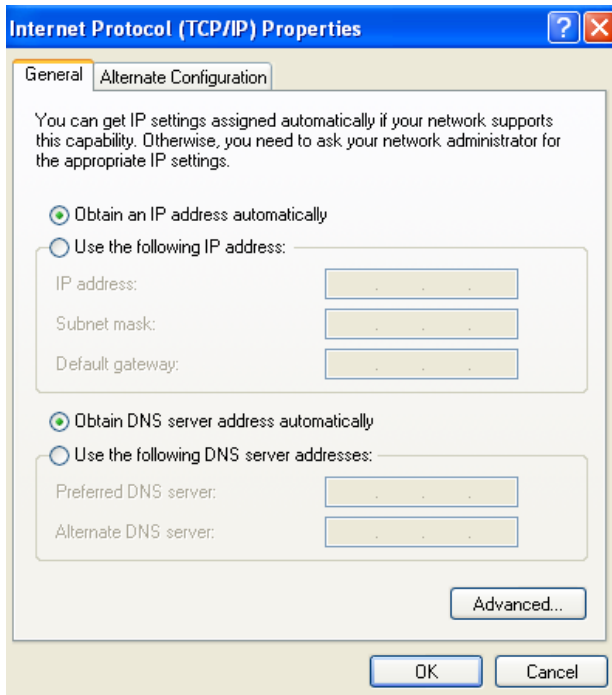


- ✓ Click 
- ✓ You get the following window:

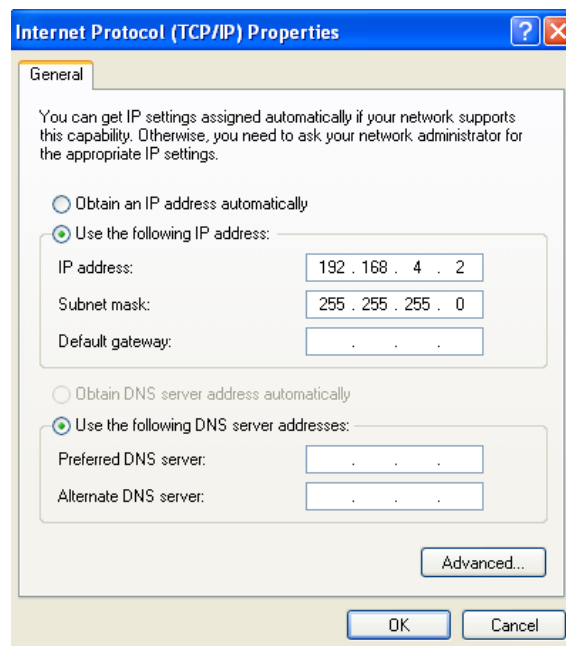


- ✓ Double-click  **Internet Protocol (TCP/IP)**
- ✓ You get the following window:





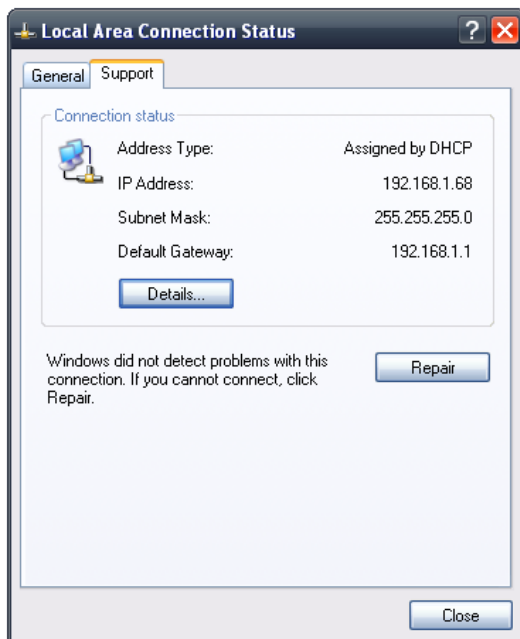
- ✓ In case you set the DHCP active on your BeanGateway®, the BeanGateway® IP is directly obtained by the network, choose the option ☒ Obtain an IP address automatically
- ✓ If the DHCP option has not been activated, you must enter a static IP **192.168.4.2** on your PC with a subnet mask: 255.255.255.0.



- ✓ Click "OK" to confirm and safeguard your work.



- ✓ Your computer is now connected to your wireless sensor networks. In order facilitate these exchanges you must give commands from BeanScape®.
- ✓ Reach the "Start" menu in the bottom left of the computer screen.
- ✓ The above image shows the start menu. Select the folder named "Control Panel".
- ✓ You will find more information by opening Windows "Local Area Network Connection" and clicking on the **Support** tab.
- ✓ You will see the following window:



By default the BeanGateway® IP address is set at 192.168.4.123 with the DHCP disabled. The BeanGateway® is considered as a client by the BeanScape® (server) having the IP address by default set to 192.168.4.2.



Make sure that no antivirus/firewall is blocking the Network activity between the BeanGateway® and the BeanScape®



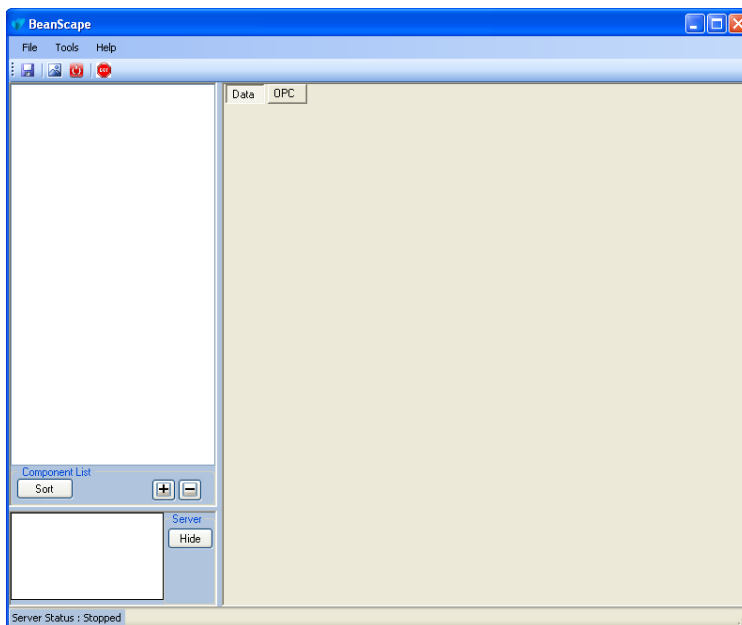
8.3 START THE BEANSCAPE®

To start BeanScape®, please follow the instructions:

- Start BeanScape® by double-clicking the icon

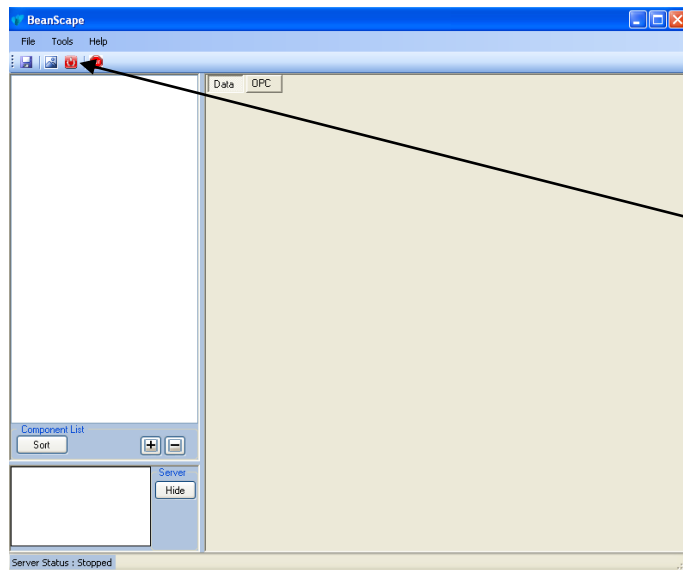


- You get the following screen:



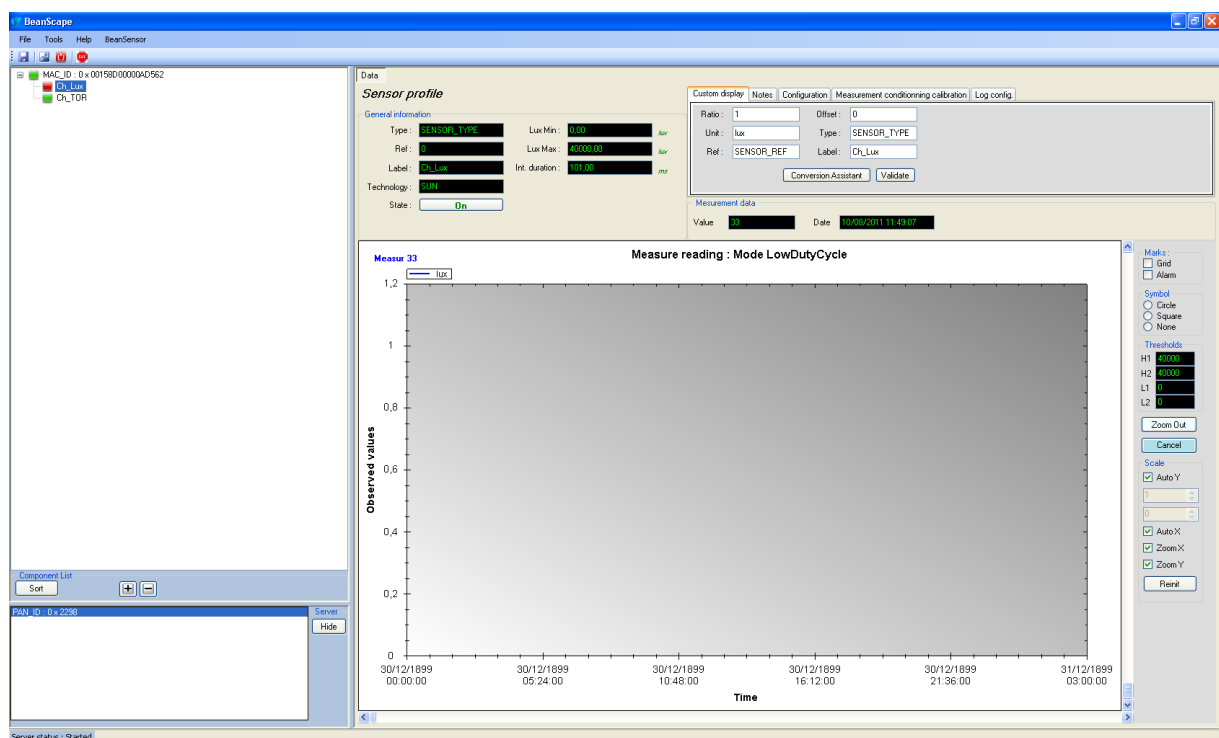
- Start the server by clicking the Start button 





Click here

The BeanScope® server starts, and creates the BeanDevice® mapping based.



8.4 LAN/ETHERNET CONFIGURATION (FOR ADVANCED USER ONLY)



Click on the following weblink to see the video: [BeanGateway® Ethernet/LAN Configuration, directly connected to the Laptop/PC](#)



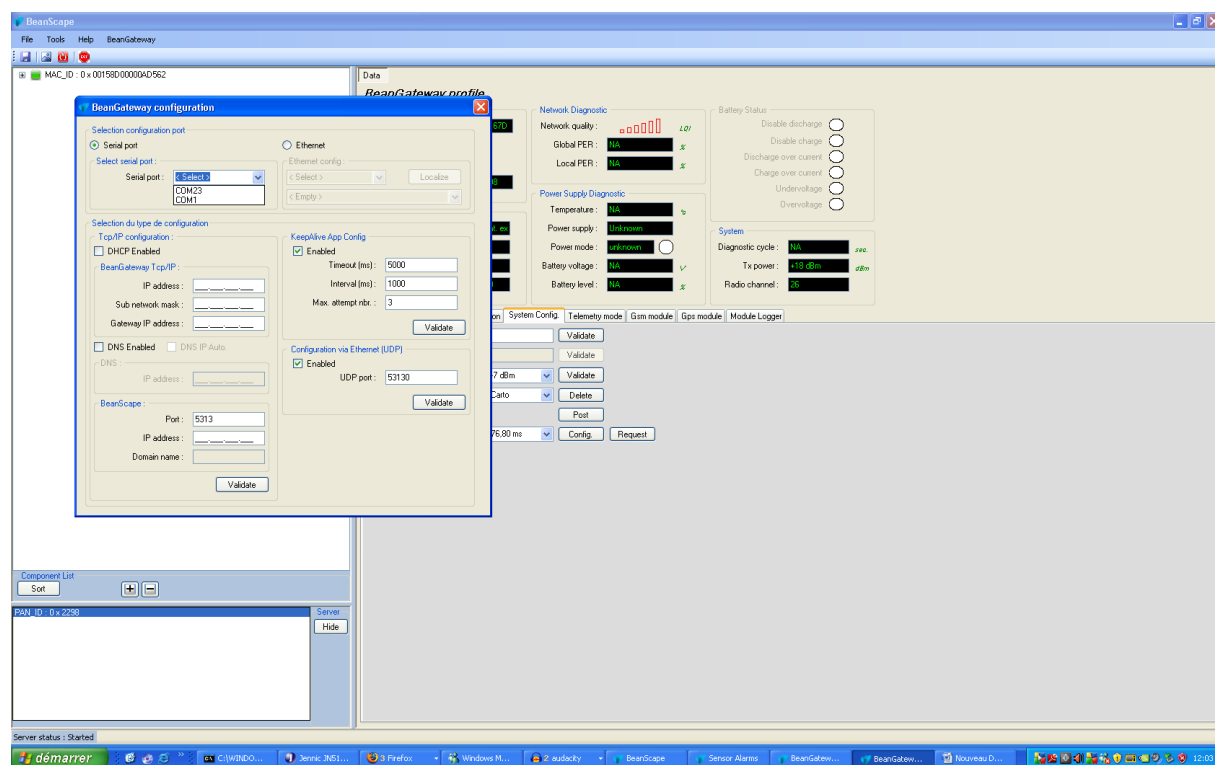
Please check your Network settings before you make any changes.

By default, the BeanGateway® is configured with a static IP address: **192.168.4.123**. This allows the user to connect fastly the Beangateway® to a PC.

If you want to set the BeanGateway® IP on your business network and get a dynamic IP address (via DHCP), you can configure the BeanGateway® via a serial port or via the Ethernet.

Go on your Beangateway® profile and click on Tools, then click on Beangateway config.

A new window will open called "Beangateway® configuration"



Choose the configuration Port: Serial Port or Ethernet

Select the Serial Port on your PC

DHCP Enabled (if the case)

IP address of your BeanGateway®

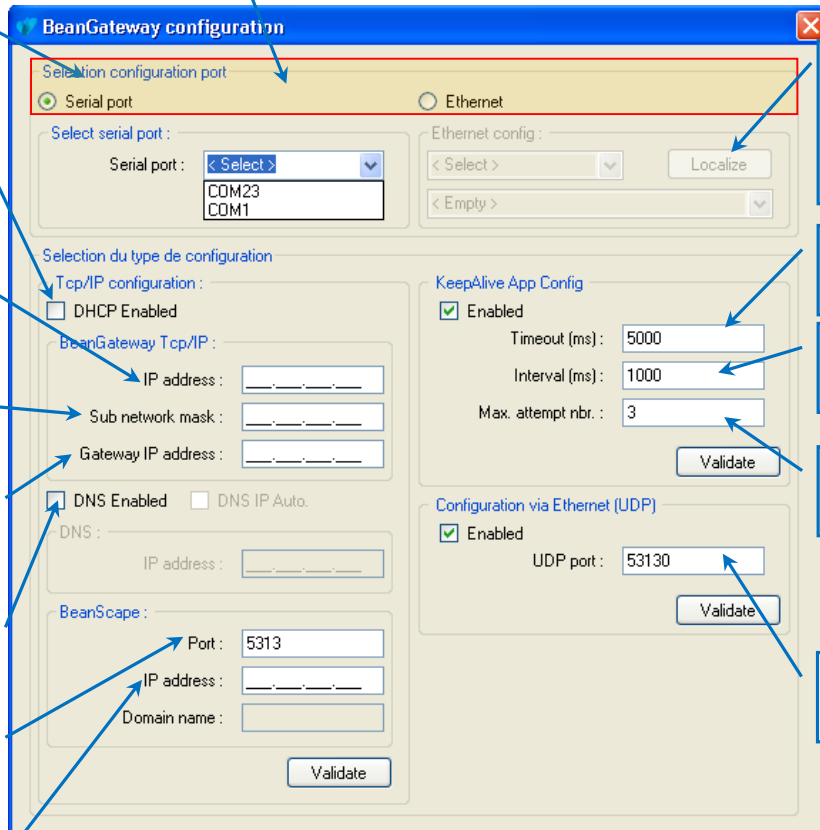
Subnet network mask

Subnet Gateway IP Address

DNS Enabled (if the case is checked)

BeanScape® / PC Socket Port

BeanScape® / PC IP Address



The screenshot shows the 'BeanGateway configuration' window. It has two tabs: 'Serial port' (selected) and 'Ethernet'. The 'Serial port' tab contains fields for 'Select serial port' (a dropdown menu showing 'COM23' and 'COM1'), 'TCP/IP configuration' (with checkboxes for 'DHCP Enabled' and 'DNS Enabled'), and 'BeanScape' (with fields for 'Port' (5313), 'IP address', and 'Domain name'). The 'Ethernet' tab contains fields for 'Ethernet config' (a dropdown menu), 'KeepAlive App Config' (with checkboxes for 'Enabled', 'Timeout (ms)' (5000), 'Interval (ms)' (1000), and 'Max. attempt nbr.' (3)), and 'Configuration via Ethernet (UDP)' (with checkboxes for 'Enabled' and 'UDP port' (53130)). There are 'Localize', 'Validate', and 'Validate' buttons. Annotations with arrows point from text boxes to various fields: 'Choose the configuration Port: Serial Port or Ethernet' points to the tab selection; 'Select the Serial Port on your PC' points to the 'Select serial port' dropdown; 'DHCP Enabled (if the case)' points to the 'DHCP Enabled' checkbox; 'IP address of your BeanGateway®' points to the 'IP address' field in the 'BeanScape' section; 'Subnet network mask' points to the 'Sub network mask' field; 'Subnet Gateway IP Address' points to the 'Gateway IP address' field; 'DNS Enabled (if the case is checked)' points to the 'DNS Enabled' checkbox; 'BeanScape® / PC Socket Port' points to the 'Port' field; 'BeanScape® / PC IP Address' points to the 'IP address' field; 'Localize the entire device connected on the LAN router' points to the 'Localize' button; 'Keep alive Timeout (ms)' points to the 'Timeout (ms)' field; 'Keep alive interval (ms)' points to the 'Interval (ms)' field; 'Keep alive max retry' points to the 'Max. attempt nbr.' field; and 'UDP Port' points to the 'UDP port' field.

Localize the entire device connected on the LAN router

Keep alive Timeout (ms)

Keep alive interval (ms)

Keep alive max retry

UDP Port

■ **DHCP Enabled:** Check this case if you want to enable the DHCP. For further informations about DHCP read the [Technical Note "BeanGateway® management on your Local Area Network infrastructure"](#).

■ **If DHCP is not activated, the user must configure the Beangateway® IP parameters:**

- **IP Address:** BeanGateway IP Address. The BeanGateway® IP address should have the following form: "X.Y.Z.B". With A, B, X, Y and Z numbers between 0 and 255
- **Subnet Network mask:** The subnet mask is set to "255.255.255.0" by default
- **Gateway IP Address:** Subnet network mask

■ **DNS Enabled:** Check this case if you want to enable the DNS. For further information about DNS read the [Technical Note "BeanGateway® management on your Local Area Network infrastructure"](#).

■ The gateway IP address subnet is the default "X.Y.Z.1"

■ **Port:** By default the communication port used is "5313". This port is generally free, if not choose another Socket Port.



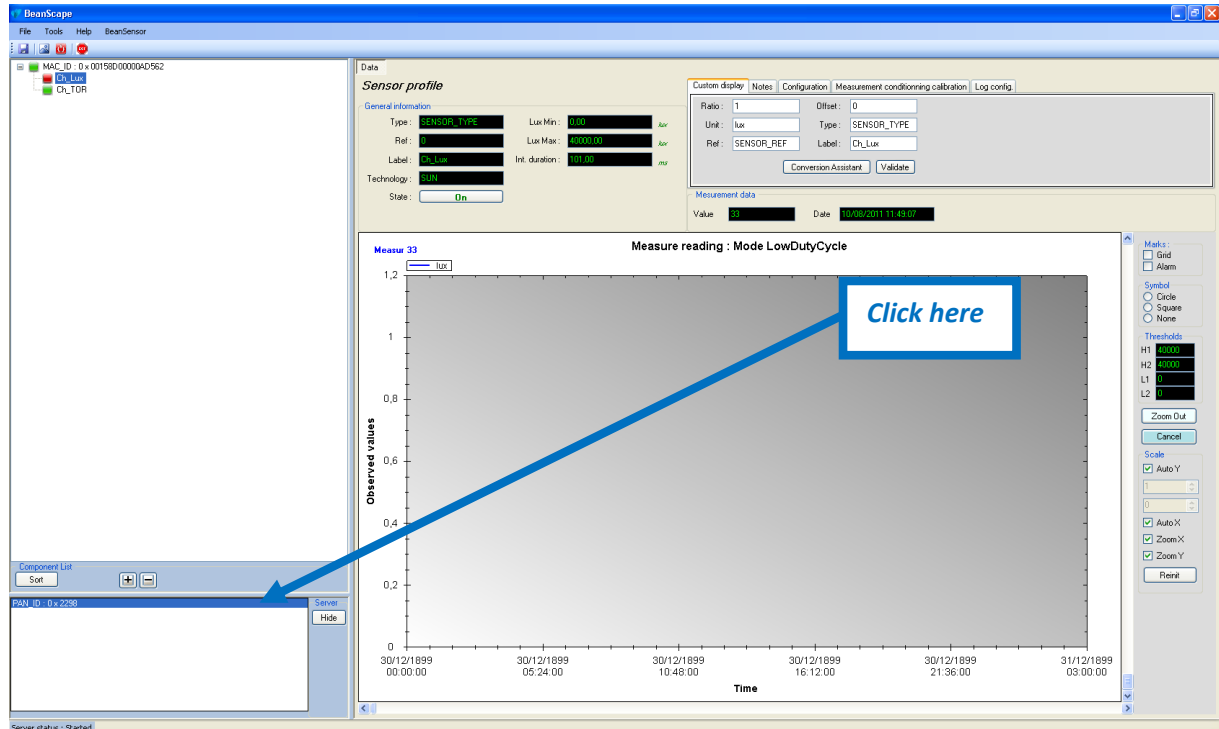
For further information, please read the following technical note– TN_RF_009 – « BeanGateway® management on LAN infrastructure »



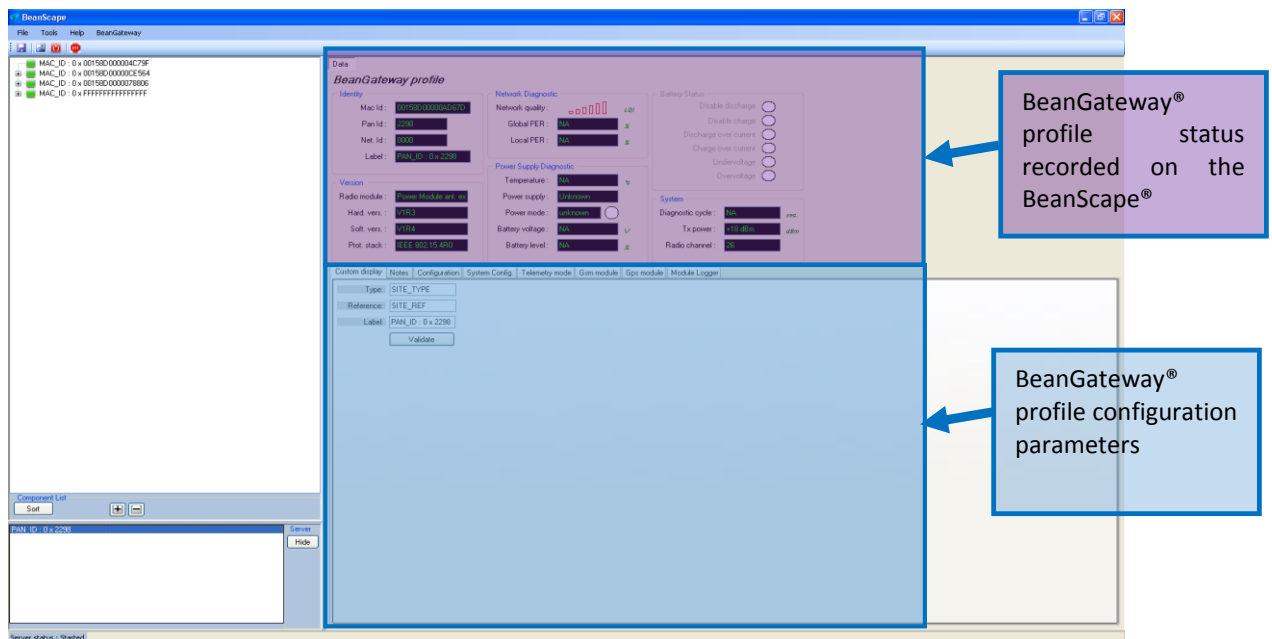
8.5 BEANGATEWAY® PROFILE

Click on a **BeanGateway®** network coordinator located on the lower left window.

The **BeanGateway®** is identified by its PAN ID.



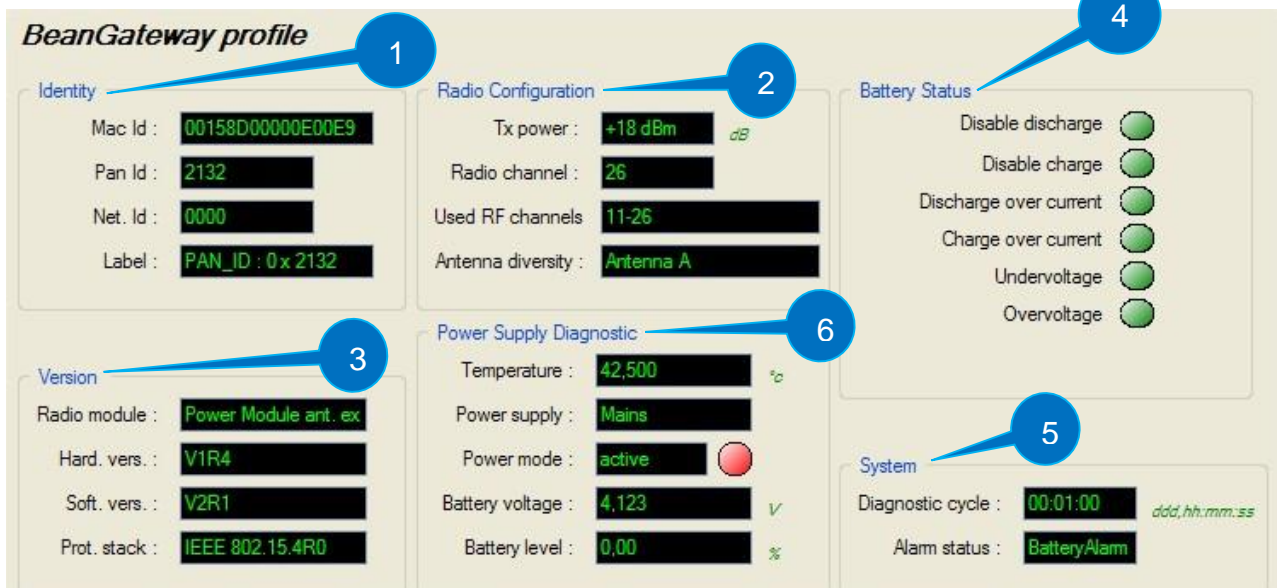
✓ You will see the following window:



The BeanGateway® profile is divided into two frames:

- ✓ Profile status
- ✓ Profile configuration parameters

8.5.1 BeanGateway® profile status description



The screenshot shows the 'BeanGateway profile' interface. It is divided into several sections:

- Identity (1):** Contains fields for Mac Id (00158D00000E00E9), Pan Id (2132), Net. Id (0000), and Label (PAN_ID : 0x 2132).
- Radio Configuration (2):** Contains fields for Tx power (+18 dBm), Radio channel (26), Used RF channels (11-26), and Antenna diversity (Antenna A).
- Version (3):** Contains fields for Radio module (Power Module ant. ex), Hard. vers. (V1R4), Soft. vers. (V2R1), and Prot. stack (IEEE 802.15.4R0).
- Power Supply Diagnostic (6):** Contains fields for Temperature (42,500 °C), Power supply (Mains), Power mode (active), Battery voltage (4,123 V), and Battery level (0,00 %).
- Battery Status (4):** Contains a list of status indicators: Disable discharge, Disable charge, Discharge over current, Charge over current, Undervoltage, and Overvoltage, each with a green circle icon.
- System (5):** Contains fields for Diagnostic cycle (00:01:00) and Alarm status (BatteryAlarm).

1

This frame displays all the ID allocated to the BeanGateway®:

- **MAC Address (encoded on 64-bits):** MAC Address (encoded on 64-bits): The Media Access Control address is a unique identifier assigned to the BeanDevice® by the manufacturer for identification.
- **PAN Address (encoded on 16-bits):** Personal Area Network address.
- **Network Address on 16-bits:** This address is allocated by the BeanGateway® when you start the network.
- **Label:** By default the MAC address is registered as a Label. This label can be changed by the user.

2

Radio configuration:

- **TX power:** Displays Radio TX Power in dBm (antenna power is not included)
- **Radio channel:** used (Radio Channel between 11 and 26)
- **Used Radio Channels:** Authorized RF Channels are displayed here;
- **Antenna diversity:** Antenna diversity technique is displayed here: Antenna A, Antenna B, Antenna diversity activated (only available on the **BeanGateway® V3.4 hardware version**)

3

This frame displays the BeanGateway® version:

- **Radio module:** Radio module used on the BeanGateway®
- **Hardware version :** BeanGateway® hardware version

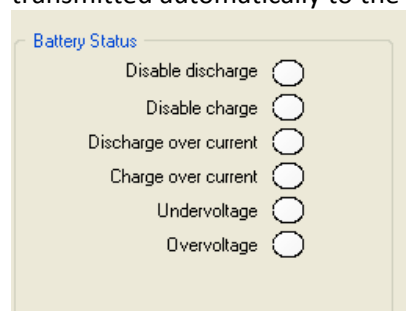


	<ul style="list-style-type: none"> • Software version: BeanGateway® software version • Wireless Protocol stack: Wireless protocol stack used
4	Battery status frame. See next section.
5	<ul style="list-style-type: none"> • Diagnostic Cycle: Displays diagnostic cycle in seconds (battery charge status, internal temperature, LQI, PER...). • Alarm status: Displays buzzer status
6	<ul style="list-style-type: none"> • Temperature: Internal temperature of the BeanDevice® with a resolution of 0,125°C • Power supply Status: Main or Battery • Battery voltage: Battery voltage in Volts • Battery level: Battery charge level, 0 to 100% with a resolution of 0, 01%

8.5.1.1 Frame : Battery status

This frame displays information on battery/primary cell status.

The **BeanGateway®** performs frequently a battery diagnostic on the **BeanGateway®**. An alarm notification is transmitted automatically to the **BeanGateway®** if a battery failure is detected on the **BeanGateway®**.



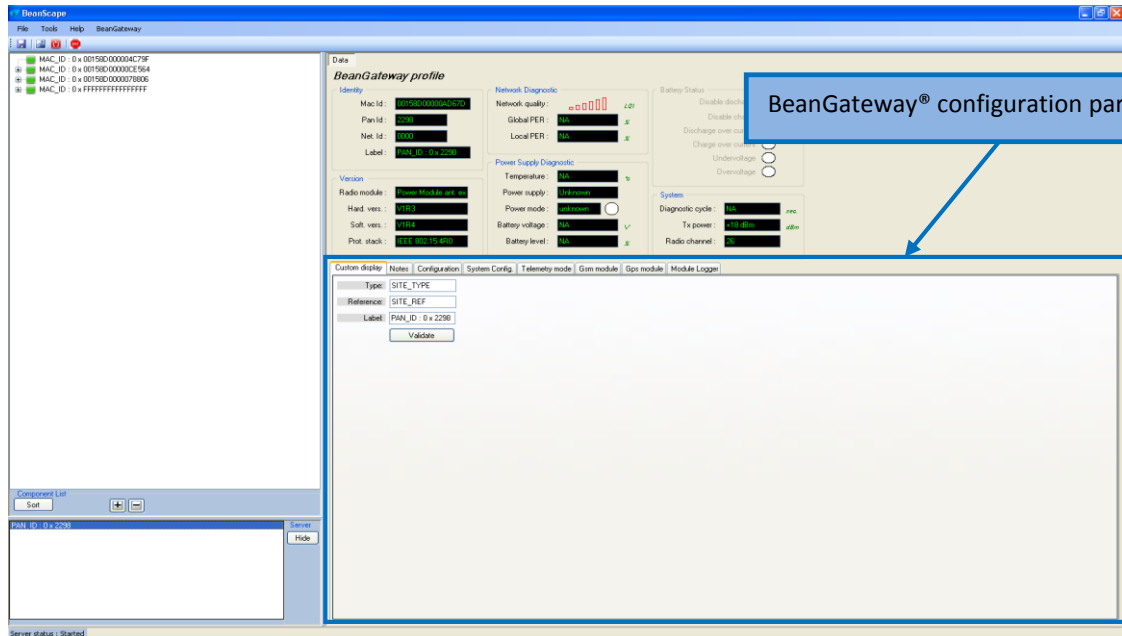
If any battery status information is displayed (ex: **BeanGateway®** is not connected), status led is white. When LEDs are green a normal state is indicated. During a malfunction, the LEDs turns red.

Here are the details:

Led definition	Green Led signification	Red led signification
Disable Discharge	Battery discharge activated	Battery discharge deactivated
Disable Charge	Battery charge activated	Battery charge deactivated
Over current during battery discharge	No over current during battery discharge	Over current during battery discharge detected
Over current during battery charge	No over current during battery charge	Over current during battery charge detected
Overvoltage	Any presence of battery overvoltage	Battery over voltage detected on the battery
Under voltage	Any presence of battery under voltage	Battery under voltage detected on the battery



8.6 USER-CONFIGURABLE PARAMETERS



BeanGateway® configuration parameters

Custom display | Notes | Configuration | System Config. | Module status | Gsm module | Gps module | Module Logger

Frame	Description
Custom Display	Customize the BeanGateway® label
Notes	This area contains the notes related to the BeanGateway®.
Configuration	Radio parameters configuration (RF channels, Energy Scan, PAN ID....)
System configuration	System configuration (Diagnostic cycle, Nwk deletion, Post system clock...)
Module Status	Module status (GPS, Logger)
GPS Module	GPS Module configuration (BeanGateway® GPS version only)
Logger Module	Datalogger on Micro-SD® configuration



8.6.1 Custom Display

Type :

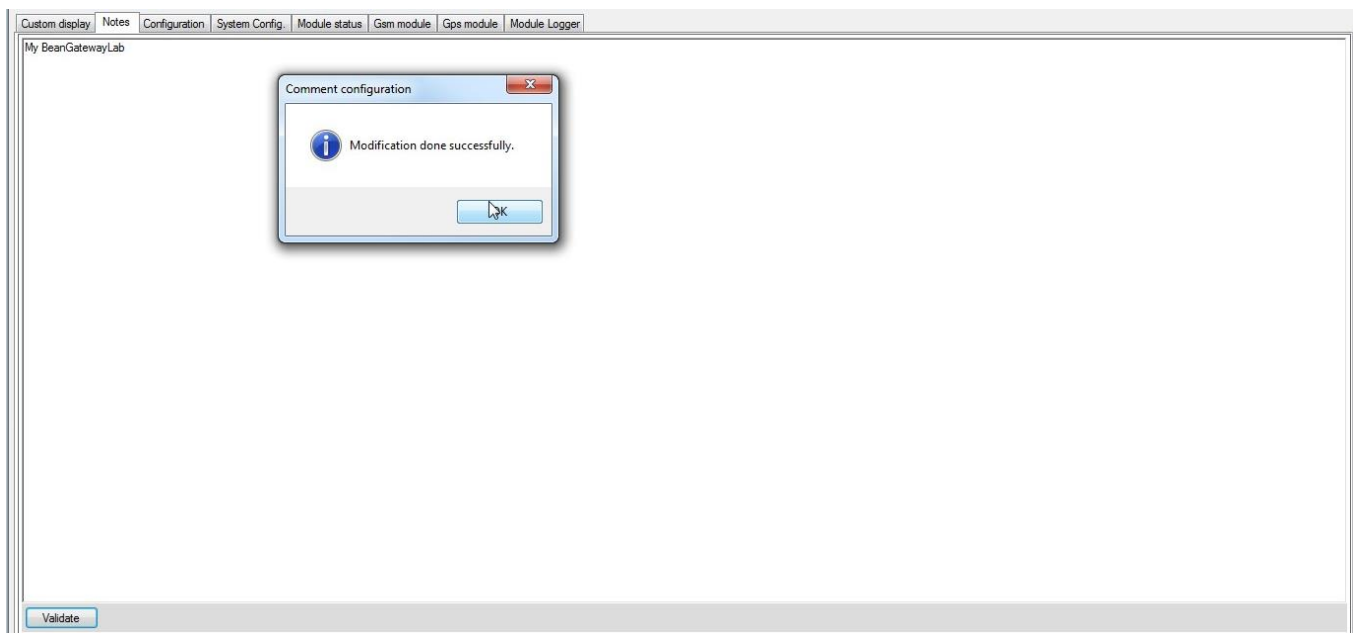
Reference :

Label :

Parameter	Description
Type	You can enter here the type of BeanGateway® you want to use.
Reference	You can assign an internal reference to the BeanDevice® you have purchased.
Label	You can assign any sort of Label to your BeanGateway®. Therefore, the user can easily associate the BeanGateway® with its equipment or environment (example: Nwk_Room_1, Nwk_Room_2).

8.6.2 Notes

This area contains the notes related to the BeanGateway®. To edit this field, enter data to save and click on "Validate".




8.6.3 Radio Configuration

PanId Configuration

New Pan Id (Hex.) :

Radio Channel Configuration


Channel list :

Energy Scan :

Energy Scan

Energy Scan :

Used RF channels configuration

Field	Parameters	Description
PAN ID Configuration	New Pan ID (HEX)	Select a PAN ID value between 0 to 3FFE. If you select a value > 3FFF , the value will not be assigned. Enter a value without “0x”. Example: 03AB , 3DC2.
Radio Channel configuration	Channel list	<p>List of channels on which the component can be set. The maximum number of RF channels is 16. The user can select a RF channel manually or automatically. Blacklisted RF channels will not appear in this list.</p> <p>« Ch_Auto» is an automatic detection of the most effective channel between channel 11 and channel 26.</p> <p>To change this area, select a value from the list and click the “Validate” button to save the base area.</p>  <p>Click on the following weblink to see the video: Automatic RF Channel selection</p>
	Energy scan	If an automatic detection is selected, the user can select the scanning on each channel.
Energy Scan	Energy Scan	The Energy Scan allows the user to know the network quality on each Radio channel. This operation allows the user to choose the appropriate RF channel on a site where the WSN is deployed. This value can vary between 0 (excellent) and 255 (poor). You can configure the scanning time means of each radio channel, by selecting the tab the scan time in ms and confirm it by pressing the “Config” button. A new energy scan is performed by clicking on the “Validate” button. Select RF channels with the least detected activity.
Used RF channels configuration	Used RF channels configuration	<p>Select the RF channels which must be used. The RF channels which are not selected are blacklisted from the energy scan process & automatic RF channel selection.</p> <p>Click on the “Validate” button.</p>



RF Power

TX Power

The TX Power unit is in dBm, it represents the power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW). The antenna radio power is not included. If the BeanDevice® PER is high or the LQI is too low, try to increase the transmission power.



Click on the following weblink to see the video: [RF Power configuration on the BeanGateway®](#)



Special care must be taken when using TX power at its minimum value (-7dBm):

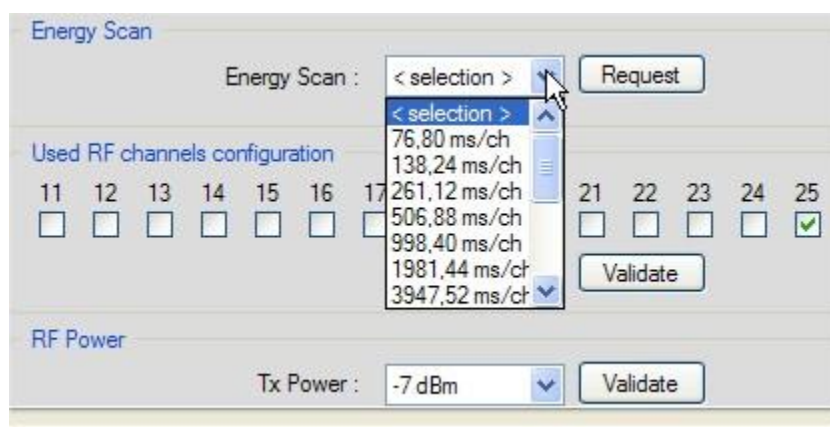
- **Make sure than the wireless range is less than 5m;**
- **In the case if the RF Link is lost between the BeanGateway® and the BeanDevice®, RF Power should be increased.**

8.6.3.1 Wireless sensor network diagnostic: Energy Scan



Click on the following weblink to see the video: [Performing an energy scan on your BeanGateway®](#)

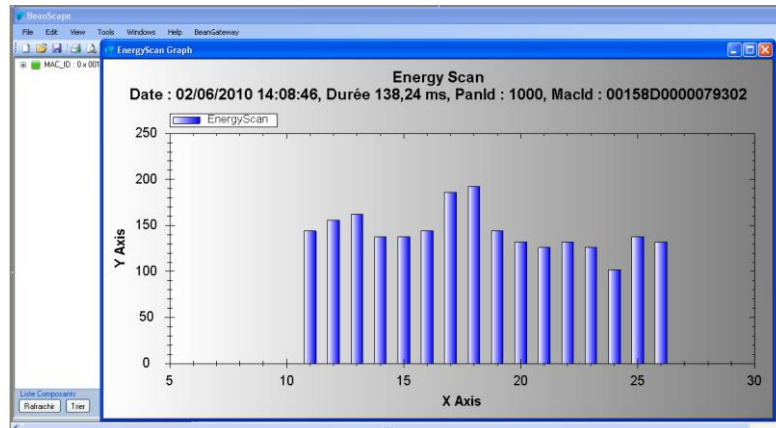
When the Energy scan is requested, the BeanGateway® will measure the energy on each RF Channel. Used during PAN initialization where the BeanGateway® is trying to find the clearest channel on which to begin setting up a PAN.



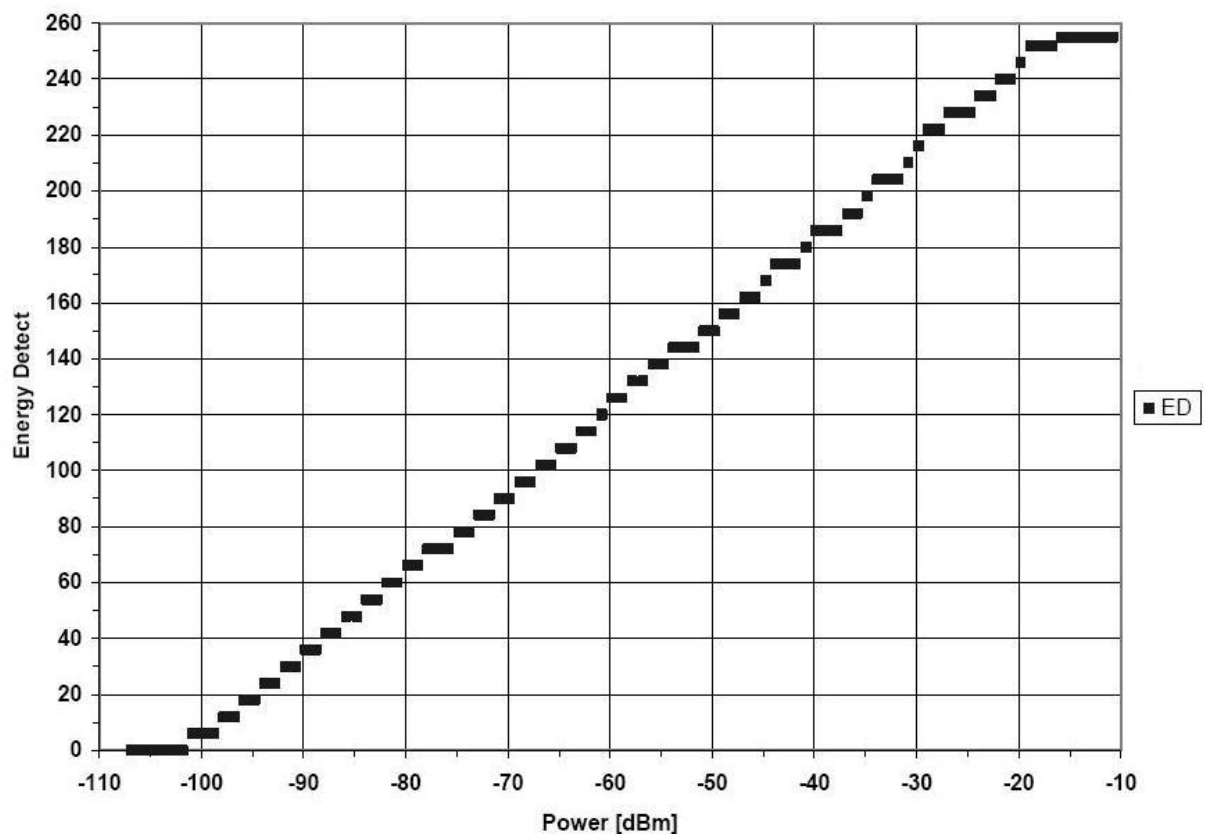
The screenshot shows the 'Energy Scan' configuration window. It includes a dropdown menu for 'Energy Scan' with a list of channel widths (76,80 ms/ch to 3947,52 ms/ch). Below this is a section for 'Used RF channels configuration' with checkboxes for channels 11 through 25. Channel 25 is checked. There is a 'Request' button. At the bottom, there is a 'Tx Power' dropdown set to '-7 dBm' and a 'Validate' button.

Press on **validate** button to start scanning different radio channels.





Select RF channels with the least detected activity.



RF

Table to convert the Energy Scan power in dBm



It is strongly recommended to perform an Energy Scan on a site before a major deployment of wireless sensor network.



8.6.3.1.1 Authorized RF channels



Click on the following weblink to see the video: [Automatic RF Channel selection](#)

Select the RF channels which must be used. The RF channels which are not selected are blacklisted from the energy scan process & automatic RF channel selection.

Click on the "**Validate**" button.

Used RF channels configuration

11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Validate

8.6.4 System Configuration

BeanScape

File Server Tools BeanGateway Help

MAC_ID : 0x 00158D00000E0088
MAC_ID : 0x 00158D00000E0156
MAC_ID : 0x 00158D00000E0095
MAC_ID : 0x 00000000000123AB
MAC_ID : 0x 00158D0000077802
MAC_ID : 0x 00158D00000E03E6

BeanGateway profile

Identity

Mac Id : 00158D00000E0320
Pan Id : 3900
Net. Id : 0000
Label : PAN_ID : 0x 3900

Radio Configuration

Tx power : +18 dBm dB
Radio channel : 26
Used RF channels : 11-26

Version

Hard. vers. : V3R4
Soft. vers. : V3R0

Power Supply Diagnostic

Temperature : 30.875 °C
Power supply : Mains
Power mode : active
Battery voltage : 4.187 V
Battery level : 0.00 %

Custom display Notes Radio Config. System Config. Module status Gsm module Gps mo

Diagnostic cycle configuration

Diagnostic cycle : s Validate



Profile Erasurement / Back to default config.

Network profile deletion : Beandevices Beandevices Full Delete

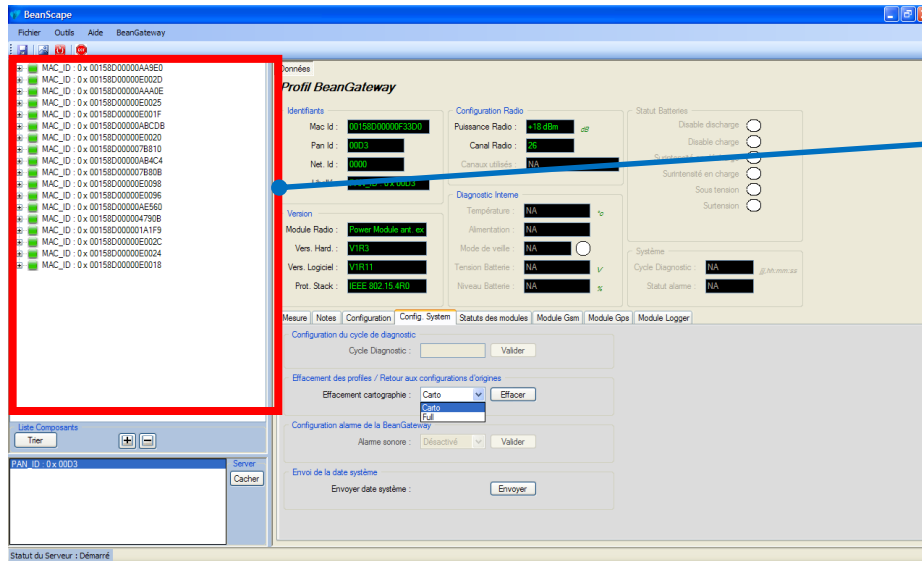
Beep sound configuration

Beep sound : Disabled Validate



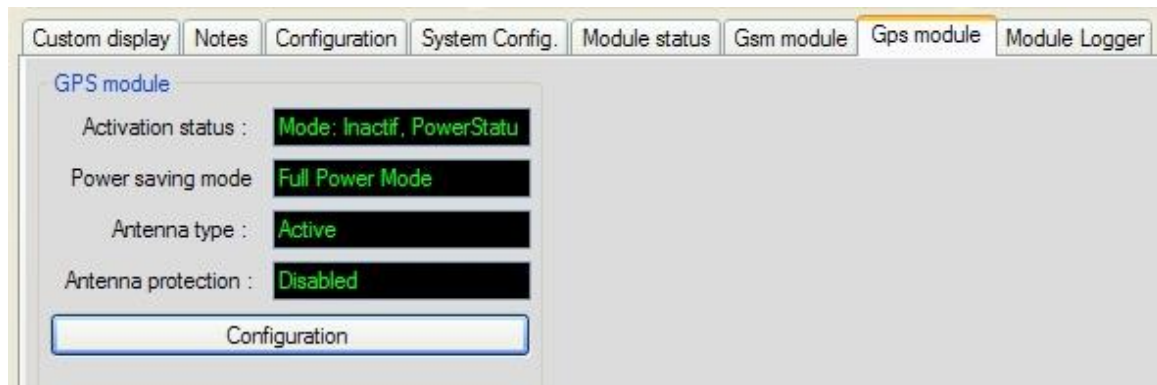
Parameter	Description
Diagnostic cycle	<p><i>Only available on the hardware version V1R4</i></p> <p><i>You can set the BeanGateway® diagnostic cycle (Battery status).</i></p>  <p><i>Click on the following weblink to see the video: Network Diagnostic configuration on the BeanGateway®</i></p>
Profile erasement/Back to default config	<p>This field is used for Beandevice® profile erasement or factor settings restoration.</p> <p><u>Network profile deletion:</u> Beandevice® profiles are deleted from the BeanGateway® DataBase & RF parameters are restored to the factory settings (TX power, Authorized RF channels, RF Channel).</p> <p><u>Full:</u> Beandevice® profiles are deleted & RF parameters are restored to the factory settings (TX power, Authorized RF channels, RF Channel) & LAN/Ethernet parameters are restored to the factory settings</p> <p>Click on Delete</p>  <p><i>Click on the following weblink to see the video: Wireless sensors profile deletion from the BeanGateway® Database</i></p>
Buzzer Alarm	<p><i>Only available on the hardware version V1R4</i></p> <p>Configure the Buzzer alarm :</p> <p>Disabled: Buzzer is disabled</p> <p>Battery alarm event: The BeanGateway® emits a beep sound every 2 seconds if the external power supply is disconnected</p> <p>Localize : A beep sound allows to localize your BeanGateway®</p>
Post system clock	<p>Net Time protocol (NTP) is used by the BeanScope® to transmit the system clock to the BeanGateway®. The System clock is then updated by the BeanGateway® Real-time clock.</p>





BeanDevice®
profile

8.6.5 GPS module status



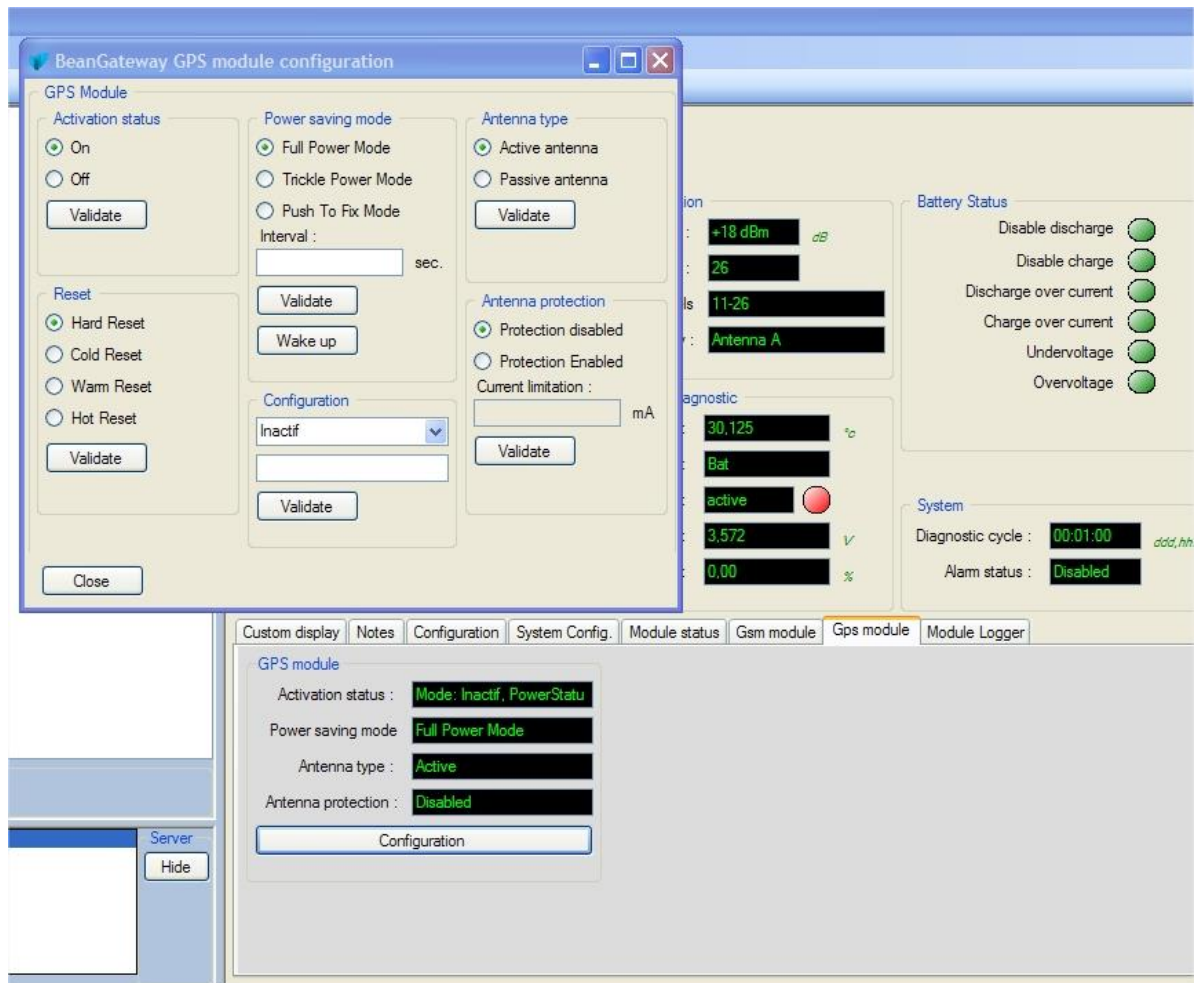
GPS Status	Description
Activation status	Displays the power status of the GPS
Power saving mode	Displays the power saving mode status of the GPS Module: <ul style="list-style-type: none"> Full power mode (Default): The power saving disabled. It is the standard operating mode, power is supplied to the receiver continuously and the GPS receiver continues to operate without an interrupt Tricklepower mode : the power to the SiRF chipset is cycled periodically, so that it operates only a fraction of the time; power is applied only when a position fix is scheduled.



	<ul style="list-style-type: none">• <i>Push-to-fix mode</i> : the GPS receiver is generally off, but turns on frequently enough to collect ephemeris data to maintain the GPS real-time clock calibration so that, upon user request, a position fix can be provided quickly after power-up.
<i>Antenna Type</i>	Antenna type status : <ul style="list-style-type: none">• <i>Active</i> : GPS Antenna is not power supplied by the module• <i>Passive</i> : GPS Antenna power supplied by the module (default)
<i>Antenna protection</i>	Antenna protection status : <ul style="list-style-type: none">• <i>Protection disabled</i> (Default): Current antenna protection is disabled• <i>Protection enabled</i> : Current antenna protection is enabled



Click on « **Configuration** », a new window will open :



GPS Parameters	Description
Activation Status	ON: Power ON the GPS Module OFF: Power OFF the GPS Module
Reset	Execution command allows resetting the GPS module : <ul style="list-style-type: none"> Hardware reset: the GPS receiver is reset and restarts by using the values stored in the internal memory of the GPS receiver. Cold reset (No Almanac, No Ephemeris): this option clears all data that is currently stored in the internal memory of the GPS receiver including Last Position, Almanac, Ephemeris, and Time. The stored Clock Drift however, is retained. Warm reset (No Ephemeris): this option clears all initialization data in the GPS receiver and subsequently reloads the data that is currently displayed in the Receiver Initialization Setup screen. Almanac is retained but Ephemeris is cleared.

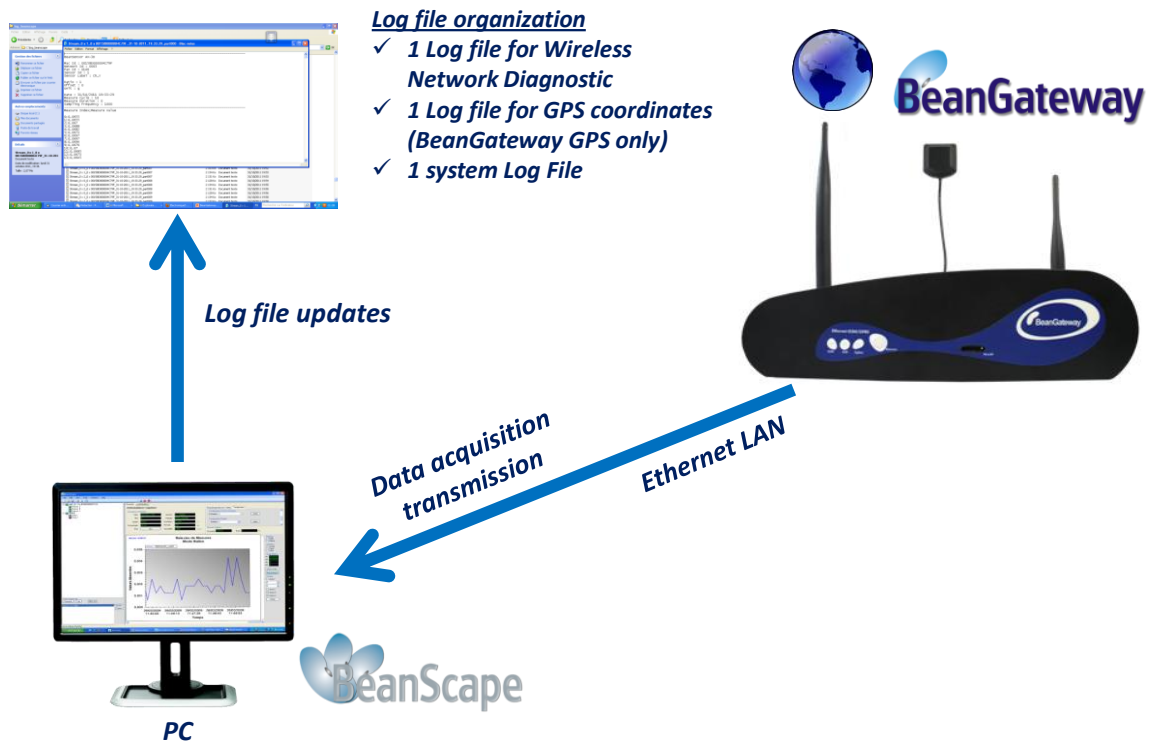


	<ul style="list-style-type: none"> • Hot reset (with stored Almanac and Ephemeris): the GPS receiver restarts by using all data that is currently stored in the internal memory of the GPS receiver; validated Almanac and Ephemeris.
Power saving mode	<p>The GPS receiver can operate in three modes :</p> <ul style="list-style-type: none"> • Full power mode (Default): power saving disabled. It is the standard operating mode ,power is supplied to the receiver continuously and the GPS receiver continues to operate without an interrupt • Tricklepower mode : the power to the SiRF chipset is cycled periodically, so that it operates only a fraction of the time; power is applied only when a position fix is scheduled. • Push-to-fix mode : the GPS receiver is generally off, but turns on frequently enough to collect ephemeris data to maintain the GPS real-time clock calibration so that, upon user request, a position fix can be provided quickly after power-up.
Configuration	<p>Request: The GPS module reads the coordinates on a request.</p> <p>Duty Cycle : The GPS Module reads the coordinates with a duty cycle specified by the end-user.</p>
Antenna type	
Antenna protection	<p>This command allows to activate an automatic protection in case of high current consumption of GPS antenna. The protection disables the GPS antenna supply voltage.</p> <ul style="list-style-type: none"> • Protection disabled (Default): deactivate current antenna protection • Protection enabled : activate current antenna protection <p>Current limitation value - the antenna current limit value in mA (0 to 200 mA)</p>



8.7 LOG FILE ORGANIZATION

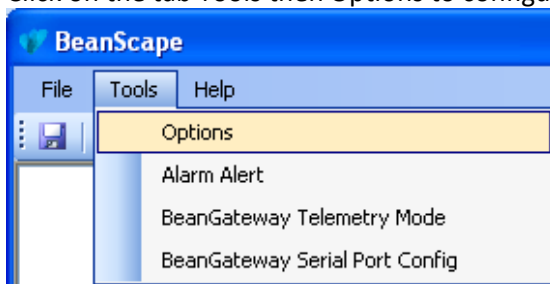
8.7.1 Log file system overview



8.7.2 Log file directory

By default the Log file directory is: **C:\log_beanscape**

Click on the tab Tools then Options to configure advanced settings in **BeanScape®**:



This window lets you configure the logs, and the data cache.

- ✓ You will see the following window :



BeanScope Configuration

LOG Configuration

Log directory : ...

Main Log filename :

Main log max. size :

Log level : ☐ 0 ☐ 1 ☐ 2 ☒ 3

Sensor Log enabled : ☒

Sensor log max. size (KB) :

Network log info. enabled : ☒

Network info log max. size (KB) :

Streaming log max. size (KB) :

BGw Module Log enabled : ☒

BGw Module log max. size (KB) :

Syst. Maint. Status Log enabled : ☒

Syst. Maint. Status log max size :

Tcp/Ip Configuration

Tcp port to listen :

KeepAliveApp

KeepAliveApp enabled : ☒

KAA timeout :

KAA interval :

Max. retry :

BeanGateway configuration via Udp

Udp port :

Language Configuration

☐ Auto
☒ English
☐ French

System Configuration

System clock transmission ☒

Clock transmission interval (sec) :

Alarm automatic display : ☐

Alarm => sound effect : ☐

Data Cache Configuration

Max. points :

Max. packets :

Max. diagnostics :

Max. alarms :

Gps coord. max. number :

Max. streaming points :

Max. BGw Module status nbr. :

Syst. Maint. Status max nbr :

Reload Apply Save Reset Close





For further information about the BeanScape® configuration, please read the BeanScape® User Manual.

8.7.3 GPS Log File Organization (BeanGateway® GPS only)

8.7.3.1 Log file naming format

The File structure is:

<MAC_ID> GPS_COORD

MAC_ID represents the BeanGateway® MAC ID

8.7.3.1 Log file analysis

The log file starts with the header:

BeanGateway® GPS Coordinate

Date : XX/XX/XX (File creation date)

PAN_ID : XXXX (BeanGateway® PAN ID)

MAC_ID : XXXX (BeanGateway® MAC ID)

The following parameters are logged:

Parameter	Specific Format	Description
GPS Date	dd/mm/20yy hh:mm:ss	<ul style="list-style-type: none"> dd – day 01..31 mm – month 01..12 20yy – year 2000 to 2099 hh : hour (0 to 23) mm : minute (0 to 59) ss : second (0 to 59)
Latitude	dd:mm.mmmm North / South (referred to GGA sentence)	<ul style="list-style-type: none"> dd – degrees 0..90 mm.mmmm – minutes 0..59.9999
Longitude	ddd:mm.mmmm East/West	<ul style="list-style-type: none"> ddd – degrees 0 to 180° mm.mmmm – minutes 0..59.9999
Horiz. Pos Ratio	x.x	Horizontal Dilution of Precision (referred to GGA sentence)
Altitude	/	Altitude - mean-sea-level (geoid) in meters



Route	ddd°mm’ss’’	Course over Ground <ul style="list-style-type: none"> ddd - degrees 000..360 mm - minutes / 00..59 ss - seconds / 00..59
Velocity	/	Speed over ground (Km/hr) (referred to VTG sentence)
Satellite Number	/	Total number of satellites in use (Min: 3, Max: Max 12)

Example of GPS log File:

BeanGateway® GPS Coordinate

Date : 15/06/2012 18:43:22

PAN_ID : 2125

MAC_ID : 00158D00000E12EB

Date GPS ; Latitude ; Longitude ; Horiz. Pos Ratio ; Altitude ; Route ; Velocity ; Satellite Nbr.

29/10/2012 16:47:33;49:0,9858:North;2:4,4888:East;5,6;-47,2;190°59'24";1,72;3

29/10/2012 16:48:43;49:0,9869:North;2:4,5808:East;7,4;61,6;345°53'24";3,7;4

29/10/2012 16:48:44;49:0,9873:North;2:4,5683:East;7,4;47,5;177°6'0";0,32;4

29/10/2012 16:48:45;49:0,9870:North;2:4,5719:East;7,4;51,7;151°56'24";0,79;4

8.7.4 Network diagnostic file organization

8.7.4.1 Log file naming format

The File structure is:

<MAC_ID> _WirelessNetwkInfo

MAC_ID represents the BeanGateway® MAC ID

8.7.4.2 Log file analysis

The log file starts with the header:

BeanComponent Wireless Network Information

Date : **XX/XX/XX (File creation date)**

PAN_ID : **XXXX (BeanGateway® PAN ID)**



MAC_ID : **XXXX** (*BeanGateway® MAC ID*)

The following parameters are logged:

- **Date:**
- **LQI:** Link quality indicator
- **Local PER:** Not Available
- **Global PER:** Not Available
- **Battery Voltage:** BeanGateway battery voltage in V
- **Battery level:** BeanGateway® battery level in %
- **Internal temperature:** Internal temperature of the BeanGateway® in °C
- **DisableDischarge:** If "**Y**" is displayed battery discharge is disabled. Otherwise the default display value is "**N**".
- **DisableCharge:** If "**Y**" is displayed, a battery charge is disabled. Otherwise the default display value is "**N**".
- **DischargeOverCurrent:** If "**Y**" is displayed, over current during battery discharge detected. Otherwise the default display value is "**N**".
- **ChargeOverCurrent:** If "**Y**" is displayed, over current during battery charge detected. Otherwise the default display value is "**N**".
- **UnderVoltage:** If "**Y**" is displayed, battery under voltage detected on the battery. Otherwise the default display value is "**N**".
- **OverVoltage:** If "**Y**" is displayed, battery over voltage detected on the battery. Otherwise the default display value is "**N**".

Example of Network diagnostic log file:

BeanComponent Wireless Network Information

Date : 17/07/2012 16:37:00

PAN_ID : 2133

MAC_ID : 00158D00000E00EB

Date ; LQI ; Local PER ; Global PER ; Battery Voltage ; Battery Level ; Internal Temperature ; DisableDischarge ; DisableCharge ; DischargeOverCurrent ; ChargeOverCurrent ; UnderVoltage ; OverVoltage

29/10/2012 16:36:59;NA;NA;NA;3,586;0,00;29,875;N;N;N;N;N;N

29/10/2012 16:37:59;NA;NA;NA;3,581;0,00;30,000;N;N;N;N;N;N

29/10/2012 16:38:59;NA;NA;NA;3,581;0,00;30,000;N;N;N;N;N;N

29/10/2012 16:39:59;NA;NA;NA;3,577;0,00;30,000;N;N;N;N;N;N





"Rethinking sensing technology"

Document version : 2.2

Document type : User Manual

BeanGateway® User Manual

29/10/2012 16:40:59;NA;NA;NA;3,577;0,00;30,000;N;N;N;N;N



Please consider the environment before printing this document.

Page : 75 / 87

9. MAINTAINING AND SUPERVISING BEANGATEWAY®

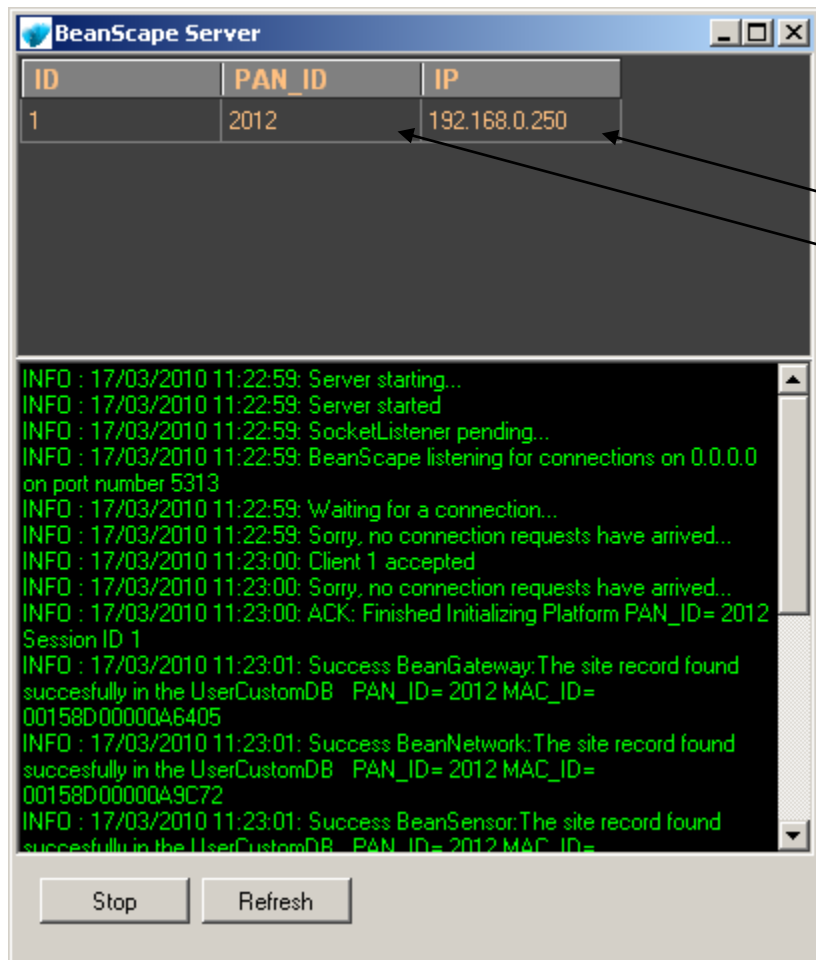
9.1 DIAGNOSIS USING BEANSCAPE®

Using the BeanScape® software, BeanScape diagnostic information and self-monitoring can be visualized

9.1.1 Knowing the PAN ID and IP address of your BeanGateway

To find the IP address and ID PAN BeanGateway network click "hide" in the window at the bottom left of BeanScape®.

You see the following window:



ID	PAN_ID	IP
1	2012	192.168.0.250

BeanGateway® IP Address

PAN ID

INFO : 17/03/2010 11:22:59: Server starting...
INFO : 17/03/2010 11:22:59: Server started
INFO : 17/03/2010 11:22:59: SocketListener pending...
INFO : 17/03/2010 11:22:59: BeanScape listening for connections on 0.0.0.0 on port number 5313
INFO : 17/03/2010 11:22:59: Waiting for a connection...
INFO : 17/03/2010 11:22:59: Sorry, no connection requests have arrived..
INFO : 17/03/2010 11:23:00: Client 1 accepted
INFO : 17/03/2010 11:23:00: Sorry, no connection requests have arrived..
INFO : 17/03/2010 11:23:00: ACK: Finished Initializing Platform PAN_ID= 2012 Session ID 1
INFO : 17/03/2010 11:23:01: Success BeanGateway: The site record found successfully in the UserCustomDB PAN_ID= 2012 MAC_ID= 00158D00000A6405
INFO : 17/03/2010 11:23:01: Success BeanNetwork: The site record found successfully in the UserCustomDB PAN_ID= 2012 MAC_ID= 00158D00000A9C72
INFO : 17/03/2010 11:23:01: Success BeanSensor: The site record found successfully in the UserCustomDB PAN_ID= 2012 MAC_ID=

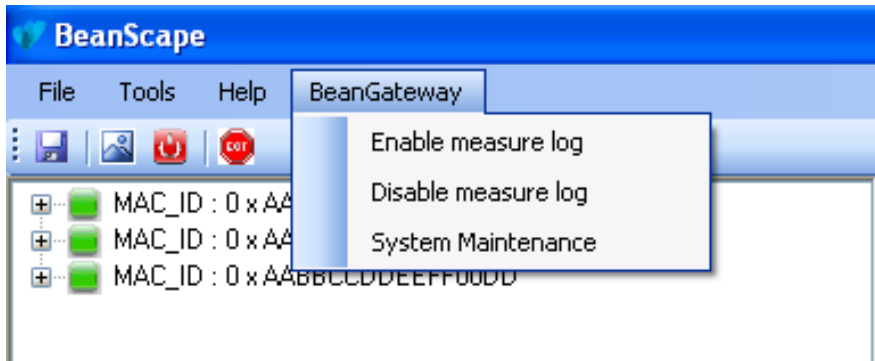
Stop Refresh

This window is the BeanScape® control server.

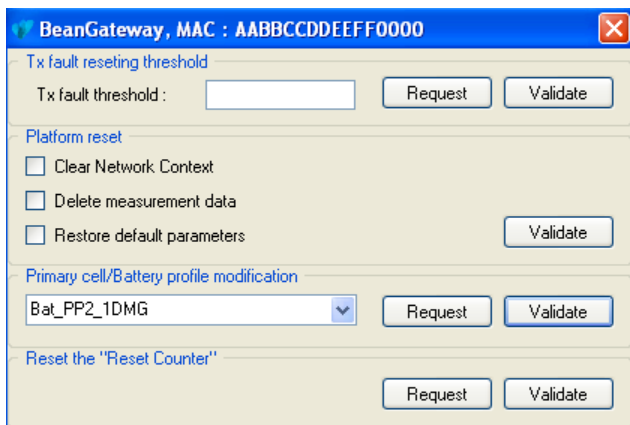


9.1.2 System Maintenance

On the main screen, select the scrolling menu “BeanGateway®” then left-click on “System Maintenance”




You will see the following window:



- **TX Fault Threshold**: This value does not change.
- **Clear Network context (software)** : This option may be substituted for the push button “Network”. However, when the BeanGateway® is not available (not powered or in sleeping mode) this option is not usable.
- **Delete measurement data**: Delete stored measurements.
- **Restore default parameters**: This option allows you to revert to factory settings.
- **Primary Cell/Battery profile modifications** : Not available on the BeanGateway®. This feature is only available on the BeanDevice®
- **Reset the « Reset counter »**: Not available on the BeanGateway®



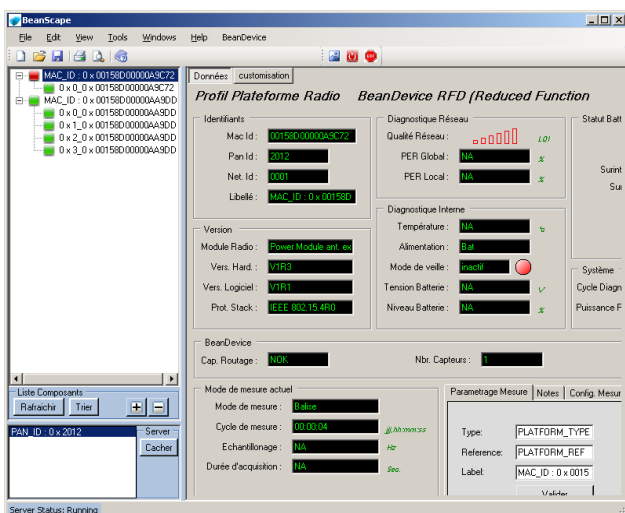
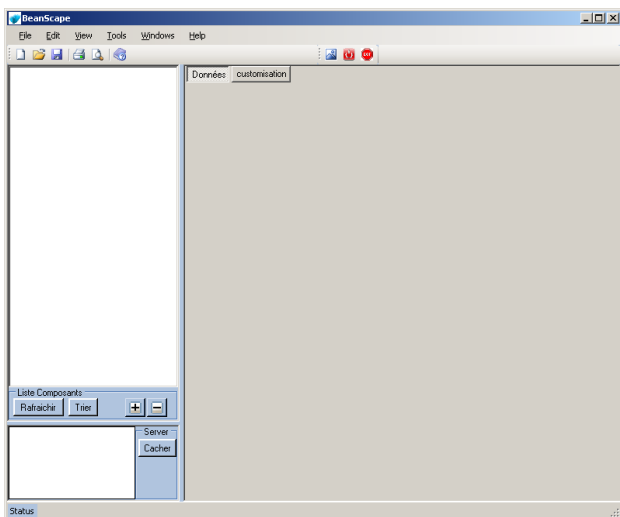
10. TROUBLESHOOTING BEANGATEWAY: FAQ

 I am not able to see the BeanGateway® status on the left side pane, why?

Check the bottom left server status BeanScape®.

“Status” means that the server is not running.

- Check the Ethernet connection. (Network and Cable settings)
- Make sure that the BeanGateway is connected and the switch is “on”.
- Make sure that the LED flashes
- Restart the server



11. ENVIRONNEMENTAL CONSTRAINTS

11.1 SEALING

BeanGateway® Indoor version is provided with a protection rating IP40.

BeanGateway® outdoor product is provided with a protection rating **IP67**.

Do not place the BeanGateway® in a maritime environment with high turbulence.

Avoid accumulation and infiltration of water through the back cover of the BeanGateway® casing.

Tighten all connections that may interfere with the seal.

11.2 SENSITIVITY TO RADIO FREQUENCY



For further information, please refer to the application note: [AN RF 007 : "Beanair WSN Deployment"](#)

11.3 TEMPERATURE

The BeanGateway® operating temperature is -20 ° C to +65 ° C.

It is recommended not to exceed these ranges. This could permanently damage the BeanGateway®.

11.4 HUMIDITY

BeanGateway® outdoor version can operate in a **90%** humid environment.

However, the IEEE 802.15.4 radio waves may deteriorate in the presence of water. Avoid placing the BeanGateway® in an enclosure surrounded by water, almost bushy plants (plants are composed of 90% water).

11.5 REFLECTIONS, OBSTRUCTIONS AND MULTIPATH



For further information, please refer to the application note: [AN RF 007 : "Beanair WSN Deployment"](#)

11.6 SHOCKS & VIBRATIONS

BeanGateway® can withstand the shocks of intensity exceeding 2g. Avoid dropping the BeanGateway®. Secure the BeanGateway® to a wall, pole or on a DIN rail.



Do not force on the connections.

11.7 ANTENNA

Depending on the type of antenna (omnidirectional, bidirectional), orient it in a particular position so that the emitted field is optimal. (See field emission 1.2.1)

When you move the BeanGateway®, make several tests by changing the orientation of the antenna and get the best arrangement.



For further information, please refer to the application note: [AN RF 007 : “Beanair WSN Deployment”](#)

11.8 OTHERS FEATURES

While having the highest BeanGateway possible transmission and receive over a wide area.

Do not take off the blue labels pasted on BeanGateway® products



12. APPENDICES

12.1 APPENIDX 1: GPS MODULE

12.1.1 What is GPS?

The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS was originally intended for military applications, but in the 1980s, the government made the system available for civilian use. GPS works in any weather conditions, anywhere in the world, 24 hours a day. There are no subscription fees or setup charges to use GPS.

12.1.2 How it works?

GPS satellites circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS receivers take this information and use triangulation to calculate the user's exact location. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received. The time difference tells the GPS receiver how far away the satellite is. Now, with distance measurements from a few more satellites, the receiver can determine the user's position and display it on the unit's electronic map.

A GPS receiver must be locked on to the signal of at least three satellites to calculate a 2D position (latitude and longitude) and track movement. With four or more satellites in view, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the user's position has been determined, the GPS unit can calculate other information, such as speed, bearing, track, trip distance, distance to destination, sunrise and sunset time and more.

12.1.3 Frequencies used

GPS satellites transmit two low power radio signals, designated L1 and L2. Civilian GPS uses the L1 frequency of 1575.42 MHz in the UHF band. The signals travel by line of sight, meaning they will pass through clouds, glass and plastic but will not go through most solid objects such as buildings and mountains.

A GPS signal contains three different bits of information - a pseudorandom code, ephemeris data and almanac data. The pseudorandom code is simply an I.D. code that identifies which satellite is transmitting information. You can view this number on your BeanScape® GPS page, as it identifies which satellites it's receiving.

Ephemeris data, which is constantly transmitted by each satellite, contains important information about the status of the satellite (healthy or unhealthy), current date and time. This part of the signal is essential for determining a position.



The almanac data tells the GPS receiver where each GPS satellite should be at any time throughout the day. Each satellite transmits almanac data showing the orbital information for that satellite and for every other satellite in the system.

12.1.4 Sources of GPS signal errors

Factors that can degrade the GPS signal and thus affect accuracy include the following:

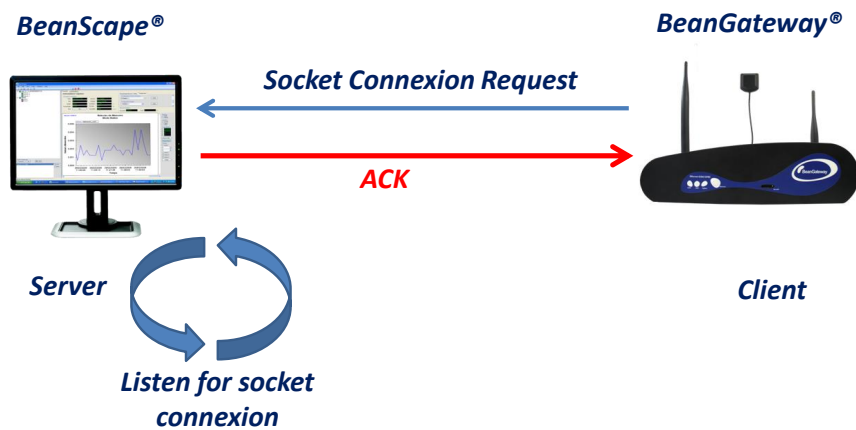
- **Ionosphere and troposphere delays** - The satellite signal slows as it passes through the atmosphere. The GPS system uses a built-in model that calculates an average amount of delay to partially correct for this type of error.
- **Signal multipath** - This occurs when the GPS signal is reflected off objects such as tall buildings or large rock surfaces before it reaches the receiver. This increases the travel time of the signal, thereby causing errors.
- **Receiver clock errors** - A receiver's built-in clock is not as accurate as the atomic clocks onboard the GPS satellites. Therefore, it may have very slight timing errors.
- **Orbital errors** - Also known as ephemeris errors, these are inaccuracies of the satellite's reported location.
- **Number of satellites visible** - The more satellites a GPS receiver can "see," the better the accuracy. Buildings, terrain, electronic interference, or sometimes even dense foliage can block signal reception, causing position errors or possibly no position reading at all. GPS units typically will not work indoors, underwater or underground.
- **Satellite geometry/shading** - This refers to the relative position of the satellites at any given time. Ideal satellite geometry exists when the satellites are located at wide angles relative to each other. Poor geometry results when the satellites are located in a line or in a tight grouping.
- **Intentional degradation of the satellite signal** - Selective Availability (SA) is an intentional degradation of the signal once imposed by the U.S. Department of Defense. SA was intended to prevent military adversaries from using the highly accurate GPS signals. The government turned off SA in May 2000, which significantly improved the accuracy of civilian GPS receivers.



12.2 APPENDIX 3: HOW THE CONNECTION IS ESTABLISHED BETWEEN THE BEANGATEWAY® AND THE BEANSCAPE® ?

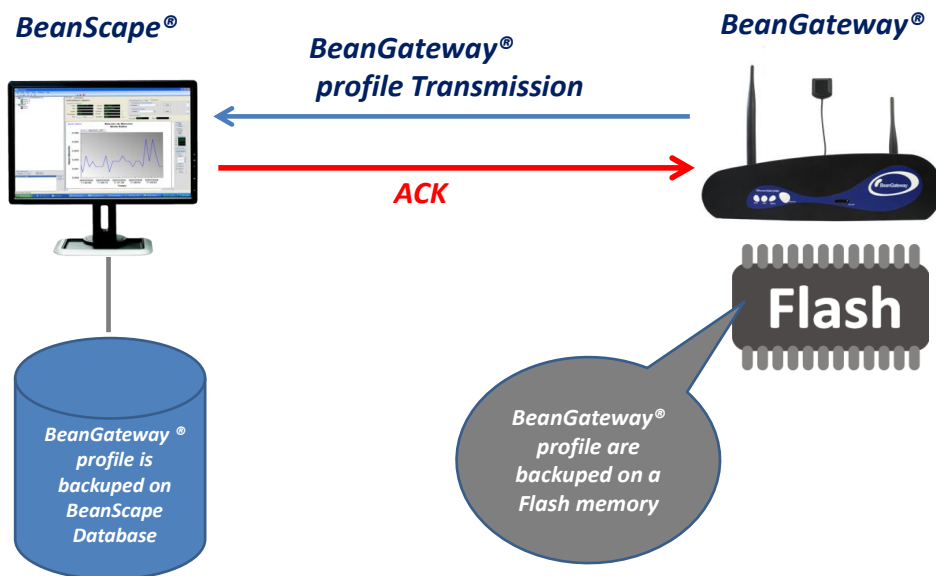
Step 1: Socket connexion

- When the BeanScape® is launched , as a server it starts with listening for a socket connexion
- When you power up the BeanGateway®, a request for socket connexion is established between the Beanscape® and the BeanGateway®
- If this request is accepted by the BeanScape®, an ACK is transmitted to the BeanGateway®



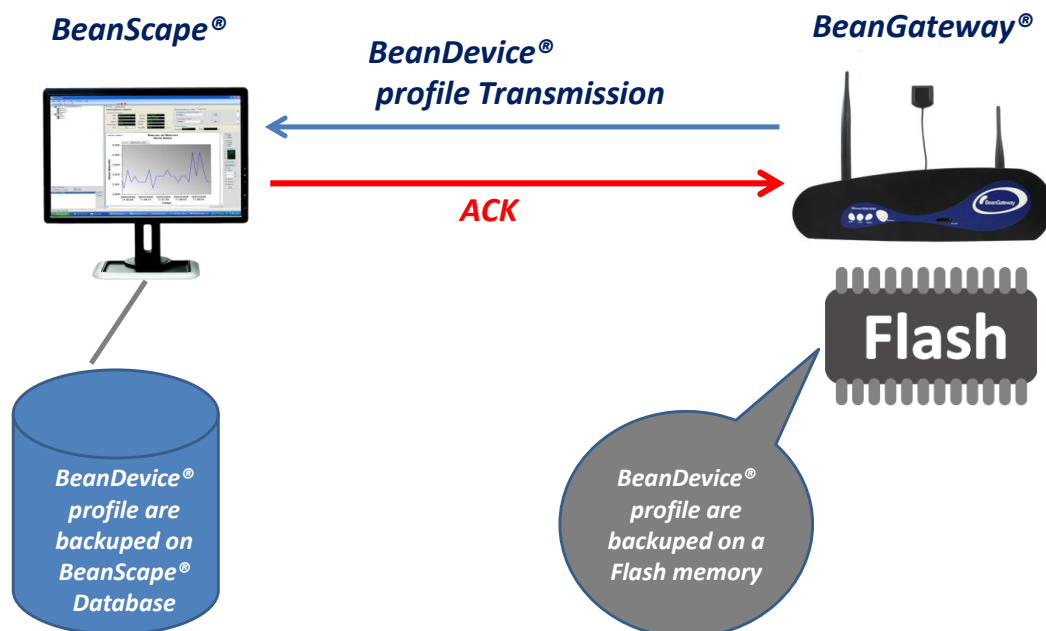
Step 2: BeanGateway® Profile Transmission

- The **BeanGateway®** profile is retained on its flash memory. This profile contains the informations about the BeanGateway® ID (NWK Add, PAN ID, MAC ID, IP...) , versions ID (Hardware, embedded software, stack...), Radio Management parameters (Radio channel, TX Power,);
- The **BeanGateway®** profile is transmitted to the BeanScape®;



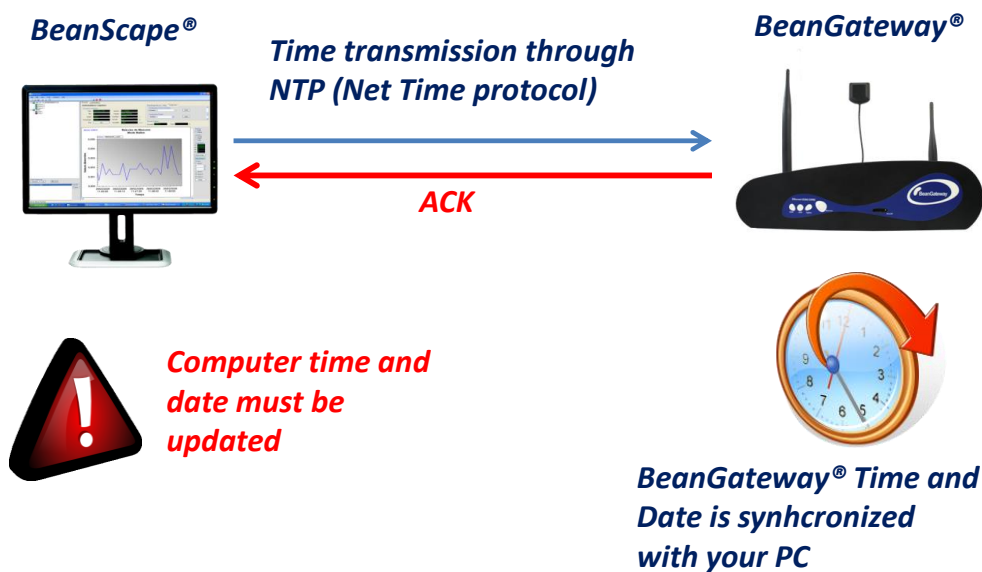
Step 3: WSN Mapping transmission

- The WSNmapping concerns all the Beandevice® profile. The WSN mapping is backedup on the BeanGateway® flash memory. When a new BeanDevice® joins a WSN, its profile is transmitted to the BeanGateway® and the BeanScape®.
- The BeanScape® displays the WSN Mapping with the BeanDevice® profile;
- WSN Mapping is backedup on the BeanScape® Database.



Step 4: Time & Date update

- Date transmission by NTP (Net-Time Protocole)
- Time & Date are updated on the BeanGateway instantly
- The BeanGateway integrates a Real-Time-Clock directly powered by th internal battery which allows to maintain the Time and Date if the BeanGateway® is power donw



The WSN Time & Date are synchronized with your PC. The User must make sure that the Time & Date on his computer are correct.





"Rethinking sensing technology"

Document version : 2.2

Document type : User Manual

BeanGateway® User Manual



Please consider the environment before printing this document.

Page : 87 / 87